

No 3848..55







Sea Milkwort.



Alpine Barrenwort.



Yellow Fumitory.



Pheasant's Eye.

HANDY-BOOK

FOR

164

THE RAMBLING BOTANIST

SUGGESTING

WHAT TO LOOK FOR AND WHERE TO GO IN THE
OUT-DOOR STUDY OF

FIELD FLOWERS AND FERNS

189

SHIRLEY HIBBERD.

AUTHOR OF "BRAMBLES AND BAY LEAVES," ETC.

CONTAINING

FIELD FLOWERS
THE FERN GARDEN

ILLUSTRATED WITH

SIXTEEN COLOURED PLATES AND NUMEROUS WOOD ENGRAVINGS

LONDON

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FIELD FLOWERS.

CHAPTER I.

INTRODUCTION.



LITTLE knowledge is a dangerous thing. A keen razor is also a dangerous thing ; ditto a lucifer match, a boiling kettle, petroleum oil, and any so-called "royal road " to knowledge. Ignorance is a dangerous thing, and a little knowledge of something or other may be as equally safe and useful ; perhaps also a source of entertainment and a stimulus to inquiry which shall at last prove that Little is the beginning of Much. Lord Bacon, in so far as his fame rests on the particular aphorism cited above, is disposed of, and we trust he will not interfere with any of our rambles in the field or studies by the way, for we are about to make a little series of foraging expeditions for purposes of health, amusement, and the acquisition, if it may be so, of a little knowledge of the vegetable kingdom. It is next to impossible to enjoy a ramble in the country or a sojourn at the seaside without some knowledge of British plants, and every one who has

been questioned by an inquisitive youngster when strolling through fields and lanes will admit that a little knowledge is better than none at all. It is not given to many to become botanists in the full sense of the word, but every one to whom God has assigned the usual allotment of physical and mental faculties, should know all the common plants of the heath and the wayside, not only by name, but to some extent also as to their history. As to the British Flora collectively, those who are familiar with it throughout number so very few that the majority of cultivated minds must be content with a partial knowledge of the subject, for the simple reason that complete knowledge is quite beyond the reach of ordinary faculties and average opportunities of observation and inquiry. But undoubtedly the more complete our knowledge the better. This little book is intended to aid in the first start, and it offers a little knowledge only, but it had better never have been written, should it be by any received as in the sense of a *quantum suff.*, on the subject to which it is devoted. It is intended as introductory to the study of British plants, and in that sense should interest as well as teach. Should it accomplish only the first of these requirements, it may justify the small amount of labour it has cost, for it is indeed the work of an hour stolen from severer duties.



CHAPTER II.

THE FLOWERS OF JANUARY.



WE may as well confess at once that there are none. But as we have seen frost in July, and lightning in January, so we have in our time made many a winter wreath of daisies, Christmas roses, primroses, snowdrops, and golden winter furze, though these flowers all properly belong to a later period of the season—they are not winter, but spring flowers. On the few days when a walk is possible in January, we need not stay within doors because vegetation is utterly unattractive. No, no. The forms of leafless trees seen against a clear grey sky should be entertainment enough even to one who is now commencing the study of botany. If you persevere in that one line of observation, my friend, you will in time learn to distinguish the several kinds of trees as easily by their outlines in winter as by their leaves or fruits in summer. See the oak spreading his gaunt arms horizontally as if performing a feat of strength. Observe the beech, how bold and strong in aspect, yet everywhere touched with a grace that the rugged oak disdains to imitate. Compare the spiry poplar that goes up like a brush (you may remember a ridiculous observation on the form of

this tree by the author of 'Vestiges,' the "electric brush realised," &c. &c.), compare this gigantic pencil with the elm and the lime, and note, now as the sunshine skims over the distant wood, what perhaps you never noted before, that the colours of leafless trees when lighted by sunshine appear uniformly tinged with a fine deep red body colour, so that if you had to paint a winter scene with sunshine, you would have to wash all the trees with a tone of red. Now allow me to make an observation which the practice of gardening has taught me about trees.

It is, that the configuration and general arrangement of their roots corresponds very closely indeed to the forms of their heads and their mode of growth above ground. There is a reason why it should be so in the constitution of the tree itself, but comparatively few people have taken notice of the fact. It was first forced upon my attention when taking up some examples of the flat-headed yew, *Taxus adpressa*, the roots of which spread out like a mat in exact imitation of the table-top branches of the tree.

From the leafless trees we may turn to the evergreens. Here is a great old holly on which you may observe two sorts of leaves: those from the ground to about ten feet above it being distinctly lobed, twisted, and prickly according to the proper pattern of a holly leaf; those on the topmost part of the tree without lobes, without spines, and not in the least twisted—like small laurel leaves, in fact, rather than leaves of holly. It was to this characteristic of an ancient holly that Southey referred in his well-known lines—

O, reader! hast thou ever stood to see
The Holly tree!
The eye that contemplates it well perceives
Its glossy leaves,
Ordered by an Intelligence so wise
As might confound an atheist's sophistries.

Below a circling fence its leaves are seen
Wrinkled and keen;
No grazing cattle through their prickly round
Can reach to wound.
But, as they grow where nothing is to fear,
Smooth and unarm'd the pointless leaves appear.

A similar change in the form of the leaf takes place in the ivy. While climbing and extending itself the leaves are distinctly lobed, and the branches are like ropes or wires. But when it has gained the topmost tower and must dangle from the summit, the leaves cease to be lobed, and become more oval and quite regular in form, and the branches become more tree-like and woody. If you at once find an example of ivy that for many years has formed a great round head upon buttress or gable, you will see that the leaves are smooth and undivided, and a majority of the branches terminate in clusters of black berries.

Two good lessons for artists: happy they who learn them thoroughly. In case the example of the ivy is not understood, here is a figure of a branch of fruiting ivy which will explain it sufficiently.

If we cannot find flowers this month, we can at least prepare for the time when flowers will abound; and the most important preliminary is that of preparing the machinery for collecting and preserving the botanical

spoils that will fall to our lot when we take to the road and become happy vagabonds.



TREE IVY.

It matters not what sort of plant we may wish to preserve, the process of preparing it is the same in principle all through. We must endeavour to obtain it in a dried state so nearly perfect that it shall still

present a natural appearance in form, colour, attitude, and every character. You will experience no trouble in obtaining what is called a "botanical box," made of tin, to carry with you in your travels, but you may do without it. If you wish to preserve only a few little wildings, a book of any sort will serve the purpose, with the aid of a few slips of clean blotting-paper. Take a fair specimen, place it between two pieces of blotting-paper, and close the book upon it, and put the book aside with a weight upon it. During hot dry weather a plant of thin texture will be well dried with its colours tolerably perfect in the course of twenty-four hours by this simple method. It is, however, much too rough and ready for all the purposes of the field botanist. Let us return, therefore, to the tin box, respecting which it may be said that, as thousands of botanists have employed it, wishing for nothing better, we have the testimony of these thousands to its usefulness.

I managed to supersede the tin box, however, very early in my rambling days by adapting a despatch case, which, when put to this purpose, we may call the *folding vasculum*. It is, as the figure will indicate, well adapted to be carried at one's back in the way of a knapsack, and it may be expanded to such a size both back and front as to accommodate the spoils of a really great day in collecting. It is the proper thing for one who goes out botanising in earnest, for, if furnished with blotting-paper, the plants can be laid out properly in the first instance, and the drying process commences at the instant of their being gathered. Many a time have I taken out specimens of the same day's gathering

and found them so perfectly dried that they were ready for mounting at once. My old folding vasculum is a



THE FOLDING VASCULUM.

stout tough thing, suited in strength and make to be handed on from father to son through many generations of botanists. It measures seventeen inches by eleven inches when opened to the full extent. The breadth

inside is nine inches ; when shut up close it is only one inch thick.

It will be well to suppose now that you have reached your house or hostelry after a day's ramble, and that your vasculum is full. You will now require a lot of blotting paper, or coarse sugar paper, for the drying business, and a couple of boards of smooth deal. Lay out a specimen on two or three thicknesses of paper with a board beneath. Do not attempt to dry more of any plant than will suffice for its fair representation ; as a rule, you do not need the roots, and a portion of stem will be sufficient. Over the selected specimen lay a good thickness of paper ; on this another plant, and so on, until the book is likely to grow too thick, or your patience is exhausted. Then put on the other board and over it a pile of books or whatever else may be convenient for pressure, and leave the affair for half a day at least ; then take to pieces and rebuild in this way : sit beside a clean fire, make a few sheets of paper quite hot by holding them near the fire, and transfer the plants from the cold damp papers to the hot dry ones, put on the board and the weights as before. Repeat this process until your plants are quite dry. If accomplished quickly and carefully, they will retain much of their natural colours, and be supple and full of character.

A method of drying thin textured plants at one operation is adopted with success by many lady botanists. The specimen is laid between considerable thicknesses of blotting paper and a hot iron applied.

There is yet a better method than either of the fore-

going. Prepare several tablets of plaster of Paris, of the size of the book the specimens are to be mounted in, and full an inch in thickness. These should be made by a worker in plaster, who, if instructed to make them *very light*, will produce a sort of plaster sponge. In drying plants first warm (and be careful not to crack by too sudden exposure to heat) one of these plates; on it lay a sheet of warm paper; then a plant, next paper, plate, paper, plant, and so on. In two hours you may repeat the process, and twice warming will suffice for almost any class of specimens, however succulent. The plaster plan preserves the natural colours beautifully, the reason being that it so quickly absorbs every particle of moisture from the plants.

We are only on the threshold to the subject at present, but must not go further. At this point, a few special hints may be added. Plants of a resinous nature, such as pines and firs, are apt to crumble to powder when dried. This may be prevented by dipping them in boiling water for a few minutes before drying them. Fungi may be dried by the simple process of bedding them in silver sand, gills upwards, in small tin boxes, and placing the boxes in a slow oven for two or three hours. Mosses and lichens make good specimens if skilfully treated by the flat-iron process.

To dispose of the specimens in an orderly way for purposes of reference is the object of constructing a Herbarium or Hortus siccus. Tough cartridge paper is the best material, and it is well if every separate sheet is occupied with only one plant. The best cement is a solution of gum arabic, with a few drops of a solution of


corrosive sublimate in alcohol added to prevent the ravages of insects. In mounting the specimens there is considerable opportunity for the exercise of taste and judgment; which no doubt you will be glad of, for as art is the "handmaid of science," an elegant herbarium affords agreeable aid in the study of botany. The final process is to label the specimens, in which you will need the aid of books.

One example must here suffice to indicate how the labelling should be done, and it will also serve to indicate how a dandelion on a sandy bank, shining in unconscious splendour, may, when transferred to the herbarium, become an awful nucleus for the aggregation around it of a sufficient number of hard words to make one's head ache. But that's the beauty of botany; if it does not make one wise, it makes one appear so, and it must be a fine thing to drag a little weed out of a dirty pond and call it *Zannichellia pedicellata*, or to point to a sedge by the same water as the rare and beautiful *Eleocharis acicularis*. But here's the label; pray don't divulge to the world that there's anything to provoke a smile in the study of botany.

NATURAL SYSTEM.	LINNÆAN SYSTEM.
Class—Exogenæ.	Class—Syngenesia.
Sub-Class—Monopetalæ.	Order—Polygamia Æqualis.
Order—Compositacæ.	(All the flowers furnished with stamens and pistils.)
(Several florets united in one re- ceptacle.)	
Genus—Leontodon.	
	Leontodon Taraxacum. Dandelion.
	Cheshunt, Herts, March, 1861.

CHAPTER III.

THE FLOWERS OF FEBRUARY.

T all depends upon the weather for flowers at this flowerless time. At the very best we shall not find many, but it will be strange if we do not find on sheltered banks and in neglected corners of the garden some wildings worth our notice. The mention of the garden reminds me that the field botanist will there learn some most useful lessons, for in the first place, every garden plant, no matter of what sort, is worthy of observation, not simply because of its own peculiar beauty, but because of its botanical affinities and structural peculiarities; and in the second place, a large proportion of our hardy garden plants are natives of Britain, or closely related to members of our indigenous flora. Thus we have in our woods and pastures two species of Hellebore, namely, *Helleborus fetidus*, the stinking hellebore, which produces its green flowers in February and March, and *H. viridis*, the green hellebore, flowering a month later. But the lovely Christmas rose, *H. niger*, the black-rooted hellebore of the old herbalists, a native of Austria, represents the whole family in the garden, and is justly prized as one of the best of hardy flowers. Sometimes so

early as Christmas, especially if we have sharp frosts in October and November, and muggy weather immediately afterwards, this noble plant presents us with its large white flowers, resembling those of the water-lily, and serving to the fanciful mind by its occurrence in the midst of winter gloom, as the counterpart of Gray's gem shining in the darkness of the ocean.—

Full many a gem of purest ray serene,
The dark unfathomed caves of ocean bear.



HELLEBORUS NIGER.

If you can find in the flowers or even in the leaves of any of the true hellebores a resemblance to the buttercup, you will have made a serviceable step in the study of botany. Pull a flower to pieces and as soon after as

possible (better if simultaneously) do the same with the flower of a buttercup, and endeavour to discover if there is any reason for associating them together as members of the same family.

The Snowdrop, *Galanthus nivalis*, we expect to see in February and rarely have to wait beyond the month for it. And most precious it is for its beauty. There may occur too on a sunny sandy mound a few stray flowers of the Dandelion, *Leontodon taraxacum*; you may be sure to find somewhere in the garden a bit of Groundsel, *Senecio vulgaris* in flower; the Coltsfoot, *Tussilago farfara* will perhaps sprinkle the railway bank with a number of its glittering golden stars, which no wild flower of this season can equal for splendour; and on heaps of rubbish and in the warmer corners of grass fields we may find the very rustic but pretty and characteristic flowers of the Red Dead-nettle, *Lamium purpureum*, which, as its name implies, will not sting the hand that plucks it. By the river side we may meet with the Marsh marigold, *Caltha palustris*; and on grassy slopes near the water's edge, and in moist spots under trees, there may be already expanded a flower or two of the lesser Celandine, *Ranunculus ficaria*, or *Ficaria ranunculoides*, the flower that Wordsworth loved—

“There's a flower that shall be mine,
'Tis the Little Celandine.”

Now, here in the same February garland we have representatives of four great natural families of plants. The hellebores, as above remarked, are relations of the buttercups, which constitute the first order of the

natural system. To this same family belong the marsh marigold, and the little celandine. The dandelion, groundsel, and coltsfoot are members of the great order of compound flowers, largely represented by the asters of the garden, and the hawkweeds of the woods. The dead-nettle belongs to the lipped flowered or labiate



RED DEAD NETTLE.

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family, in which a considerable number of aromatic plants, as for example, sage and thyme are found. Lastly, the snowdrop represents two great orders, the lilies and the amaryllids. Instead of hunting up bits of poetry and stale anecdotes about these plants, let us take

one of them, say the little celandine, as it is especially a poet's flower, and study its life history.

The Lesser Celandine, or Pilewort, is fully described



THE LESSER CELANDINE.

in all the technical books and in pretty nearly the same terms. But none of them give us its life history. It has bright green glossy, heart-shaped leaves, brilliant yellow flowers, with nine pointed petals, which give it a

somewhat starry aspect, and in common with the buttercups, its near relations, every flower contains a great many oblong anthers. At the base of each petal is a triangular scale as at A in the subjoined figure. In the flowers of the Christmas rose, and also in the Globe flower, *Trollius europæus*, similar scales are to be found. The anthers or pollen cases, which cluster in the centre, are oblong or elliptical, and burst along the two outer edges as at B in the figure.



Now this plant appears to be perfectly fitted up to produce seed, and by this means to multiply itself, as many other kinds of buttercups do. But one of its peculiarities is that it seldom or never produces seed; and yet the flowers do not open until nine o'clock in the morning, and close again early in the afternoon; in dull or wet weather they do not open at all during the day, which would lead one to think that the organs of fructification were sufficiently protected. The pollen, too, if examined under the microscope, appears to be perfect; perhaps the fact of its not ripening seed may be accounted for by the cold and wet weather we usually have during the time it is in flower. It may with reason then be asked, How is the plant propagated?

There is always plenty of this *Ranunculus* to be seen in the spring, and if it be not increased by seeds there must be some other mode equally efficacious. Yes, if you examine the plant when it is just going out of flower, you will find little whitish tubers, about the size of grains of wheat, in the axils of all the leaves, as at *a* in the next figure; these, by the decay of the plant, are scattered upon the ground, and serve the purpose of perpetuating the species quite as well as seeds could do. I believe, from an examination of specimens from a more southern clime, that the celandine never produces both seed and these tubers at the same time. It is unnecessary for the plant to be propagated in both ways, and, therefore, this is the more likely to be the case.

The Lesser Celandine loves the sloping banks of a stream, it is often found also under the shade of trees; but, unless the ground is very moist, it does not there grow so luxuriantly as by the water-side. If during autumn we part with our hands the coarse grass and weeds in such a situation, we find great numbers of the seed-like tubers lying on the ground; I have counted fifty or more within the area of a square foot. About the middle of February they begin to grow, as shown in the subjoined figures; *B*, *c*, and *d*, being their first stages, and *e* being a complete young plant. By the second week in March they have reached the state seen in *d*, the old tuber is shrivelling up, and new ones are in course of formation. Some of these young plants even grow submerged, and in that case the leafstalks are always longer than usual. The

plants which are developed from the little axillary tubers are generally about three weeks later in coming into flower than those which have been previously established. I cannot understand why it is we do not find more old plants, seeing that so many young ones make their appearance every spring; and yet there



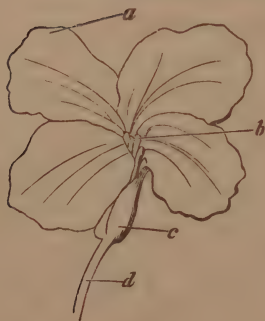
STAGES OF GROWTH OF THE TUBERS OF THE PILEWORT.

must be some cause which kills them off by thousands. This is by no means the only British plant which is destroyed in this wholesale manner; and the curious problem which this question opens would furnish the intellectual observer with a wide field for discovery.

We have in our gardens, that is to say, in a few gardens where beautiful hardy plants are really appreciated, some pretty varieties of the celandine, the best of them

being the double white and double yellow. These may be multiplied by dividing the plants, as may our wilding; and also by gathering up the white tubers that fall from the axils when the leaves begin to wither in the summer time. To say that Wordsworth is always happy in his rural images, would be like informing the reader that grass is green and the sky blue. But not too many perhaps are familiar with that pretty conceit in which he makes his favorite flower represent the rising sun of the sign-painter; but it is just after the pattern of this pretty flower the itinerant artist portrays the god of day as a welcome to rest for the weary traveller.

I have not a doubt but he,
Whosoe'er the man might be,
Who the first with pointed rays
(Workman worthy to be sainted)
Set the sign-board in a blaze,
When the rising sun he painted,
Took the fancy from a glance
Of thy glittering countenance.




CRUCIFORM BLOSSOM OF WALLFLOWER.
a, petal; *b*, stamens; *c*, flower cup, or
calyx; *d*, peduncle, or flower-stem.



PETAL OF WALLFLOWER
a, limb; *b*, claw.

CHAPTER IV.

THE FLOWERS OF MARCH.

OOD weather or bad weather we shall be sure of flowers now both in the garden and the field. It is desirable therefore in the month of March to brush up the organ of botany, in whatever part of the cranium it may be situated, and hunt up the various readings from the poets, which custom has stereotyped as essential aids to the study of field flowers. It is in the neighbourhood of a town or the very heart of a village where we shall be most likely to make good finds in the month of March, not in the open champaign country, or on the dreary moors. The very first perhaps to greet us on a sunny morning will be the Chickweed, *Stellaria media*, a prominent member of the caryophyllaceous order, and therefore a relation of the pinks and carnations. What a bonny sheet of emerald green dotted with whitest stars it makes on the sheltered hedge-bank and on all the flower-beds of the newly made garden—a beautiful plant, but little noticed because “common of the common place.” The bird fancier can scarcely look at a bank of shining chickweed without echoing the familiar song of the streets, “chickweed and grunsel for your singing birds.” It is not

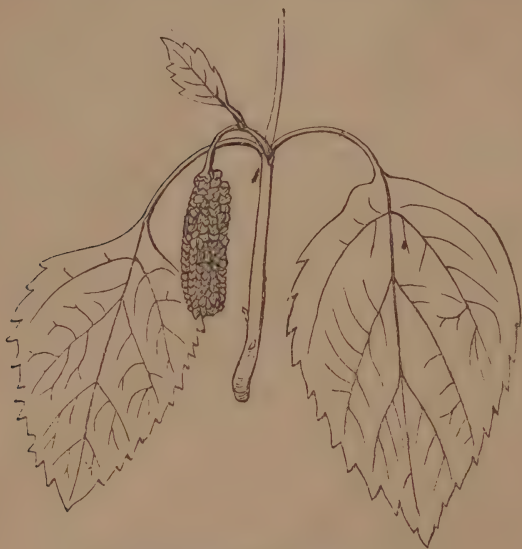
only good for cage birds, but makes a good dish of spinach if carefully cooked. Several interesting little plants will now be coming into bloom in sheltered nooks, on sandy soils, and amongst rocks, and on the summits of old walls. The most beautiful of all these is the whitlow grass, *Draba verna*, a plant much prized for planting on the "rockery" in the garden. The leaves form a minute tuft, all radiating from the centre, whence springs the slender flower stem bearing little white cross-shaped (cruciferous) flowers and oval seed pods. Every separate plant covers about the same extent of ground as a florin would, but we rarely meet with a single plant; if it occurs at all it is usually, as at Tunbridge rocks for example, in dense masses, forming exquisite miniature flower gardens on a ground work of greenest moss. The Yellow Whitlow grass, *D. aizoides*, is still more beautiful and very rare in this country, though plentiful in alpine countries on the Continent. The only recorded British station of this plant is "near Swansea," but you may find it in any of the large nurseries where extensive collections of herbaceous plants are grown. A host of pretty relatives of this plant may be found on any sunny spots and especially on walls. One of them may be recognised by its peculiar lyre-shaped leaves, forming an elegant flat tuft and smooth flower-stalks bearing white cross-shaped flowers and little globose seed-vessels. It is the Naked stalked Teesdale, *Teesdalia nudicaulis*. An equally pretty and very distinctive companion plant is the rock Hutchinsia, *Hutchinsia petraea*, which has leaves like those of some small fern—or that may rather be likened

to fairy ladders, or the backbone of a fish,—and very small clusters of white or lilac tinted flowers, and small oval seed pods. Both these are somewhat scarce and more likely to be found on rocks and sandy banks in the West of England than anywhere else, yet they are not so local as to be altogether past finding anywhere and everywhere on sites and soils adapted to them. Very common indeed is another of the same family, the Shepherd's Purse, *Capsella bursa pastoris*, which you may instantly recognise by its distinct heart-shaped seed pods, differing so much from those of *Thlaspi* and other genera that come near to it that mistake is next to impossible. Though one of the commonest weeds, this is a good plant to make a study of. On the starving wall it becomes a miniature beauty, in the fat farrow a coarse and altogether unattractive plant. Linnæus first grouped the cross-flowering or cruciferous plants as they are now classed by botanists, making two great divisions of short-pod and long-pod bearers, the five plants we have now had before us being examples of the first division, the long-pods comprising mustards, charlocks, and stocks, that flower later in the season. We will quit the shepherd's purse then with the remark that it may be a post-diluvian creation, because purses were not known before the flood, perhaps not money either.

“Madame Eve, who was straight as the sticks of sky-rockets,
First brought up the fashion of wearing no petticoats.”

Quite equal in attractiveness to the snug sheltered nooks in villages are the margins of woods just now, for those who are hunting for wild flowers. And ere

we begin to search amongst the heaps of drifted leaves and amongst the dead bracken, and the coarse grass on the slopes, and in the damp hollows, it may be well to look up and enjoy the delicate tracery of the trees, the interlacings of their slender branches and the exquisite pencillings they make upon the clear, cold, grey sky.



CATKIN BLOSSOM OF COMMON BIRCH.

What are those tassels and peppercorn-like things that dot the trees all over, and that you never noticed before? Why they are the flowers; the woods are now in flower, or fast coming into flower, and if we are to make any progress in field botany, we must take the trees into council with us and ask them what their notions

about flowers are. Observe the downy catkins of the Hazel nut, *Corylus avellana* ; they are the male flowers, and are always produced in the topmost parts of the tree. Below them are the female flowers, for which we may have to search, as they are less conspicuous, for they are like scaly buds, and are situated just where by and bye the fruit will be. A large number of trees flower in precisely the same manner as the familiar hazel, as the beech, the willow, the birch, &c. The long catkins are the male flowers, which make their appearance frequently in the autumn, and attain complete development in spring when the female flowers, which are quite inconspicuous, become perfect in form and function.

The question is at last forced upon us, What is a flower? It will be well, perhaps, if we endeavour to puzzle out a reply to the question as we go along ; but stop ! who could be puzzled with any question or reply in the face of such a bank of primroses as that yonder, where it seems as if the stars had come down from heaven to look for the angels that went astray after the daughters of men ages ago. You may have seen primroses before, but the flower is not one you can speak of as old, or as common, or as a weed, and yet, if the proprieties of speech are strictly observed it is old, and common, and a thorough weed, but its beauty secures for it exceptional consideration ; for we look upon primroses as upon people who never have chilblains or bad tempers. A most variable plant is this, and one that may be studied for a lifetime without being completely understood, as Mr. Darwin would tell you. You may

see, in some of the woody districts in Devonshire and Somerset, great circular clumps of wild primroses, covering sometimes as much as a hundred square yards each, and comprising flowers of fifty different hues. Sometimes in these clumps there is not one yellow or yellowish-white flower, though these are the prevailing colours of primroses in the midlands and the east of England. But we shall find palest lilac, delicate rose, rich purple, and sometimes a rare and curious tint of blue, with here and there a flower in which the purple and the



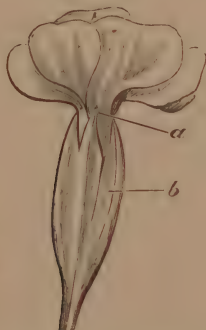
FLOWER OF COMMON PRIMROSE LAID OPEN.

a, limb of corolla ; *b*, tube of corolla ; *c*, calyx ; *d*, pistil ;
e, stamens.

yellow have become absurdly mixed, the result being an indescribable dirty brown colour—a primrose almost obnoxious to the sight ! But the variability under cultivation is more remarkable. We have in our gardens primroses of all colours except clear scarlet

and true blue, and many of them are so truly superb that in their season there are really no hardy plants to surpass them, especially the large single mauve-coloured variety called "lilacina," and the "double crimson," and "double white."

Now is it not odd, that in sheer admiration of a primrose I have actually pulled it to pieces? It's a wonder I did not put it in my mouth and chew it up to prove my regard for it. But that's the way of the world—to spoil all pets and make them ridiculous. However, here is a flower I have partially destroyed, and it presents a good vertical section for a first lesson



COMPLETE FLOWER OF COMMON PRIMROSE.

a, tube of corolla; *b*, tubular campanulate calyx.

in botany, so let us make a beginning thus, in technical education. I place a complete flower beside it to give speed to the teaching.

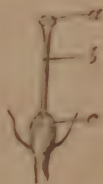
A complete flower, no matter of what kind, contains five sets of organs. Now the primrose is a complete

flower, as distinguished from such flowers as those of the hazel that we were admiring just now, all of which are incomplete, and thus nature, for the perpetuation of the species, must produce two sorts of hazel flowers on every hazel tree. In the primrose flowers we have a *corolla*, usually of a pale yellow colour, which consists of five *petals*. The corolla is, in the majority of instances, the most showy part of a flower, but there are many remarkable exceptions; here, at all events, the petals are broad, united below into a tube, and expanding above into a salver-shaped cup; and it is the corolla which attracts us, and constitutes the characteristic part of the flower. But below the petals are five green, clasping, claw-like leaves called *sepals*, which form a



STAMEN.

a, anther; *b*, filament; *c*, pollen.



PISTIL OF PRIMROSE.

a, stigma; *b*, style; *c*, ovary.

separate tube or cup as if for the protection of the flower, and bearing the name of *calyx*. If we look inside the flower we shall find attached to the petals small oval bodies called *stamens*, which are the male

organs, and produce a fertilising dust called *pollen*. In the very centre of the flower is a solitary *pistil*, or female



SILVER-SHAPED BLOSSOM OF COMMON PRIMEOSE.

a, Glabular stigma showing at mouth of cylindrical tube.

organ, the function of which is to receive the fertilising dust, and convey it by means of the *style* or stem which

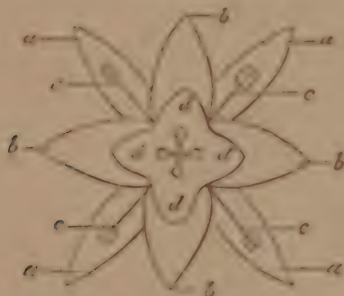


DIAGRAM OF A PERFECT FLOWER.

a a, Calycine, or external whorl, of organs alternating with *b b*, corolline whorl; *c c*, staminal whorl, opposite calycine divisions, alternate with corolline; *d d*, pistilline whorl, opposite corolline, alternating with staminal and calycine.

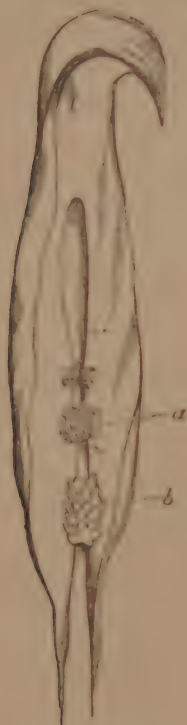
supports the head of the pistil, called the *stigma*, to the *ovary* at the base of the flower, within which the seeds are formed.

A dry lesson this, perhaps, but certainly a scanty one; for the few points touched upon do not carry us beyond the threshold of structural botany. Yet these few facts at least must be borne in mind and understood if field flowers are to be gathered with earnestness for any purpose beyond the moment of the gathering, and the ambition to seem without being wise.

A perfect flower consists of (1) corolla, (2) calyx, (3) stamens, (4) pistils, (5) ovary. The corolla consists of petals; the calyx of sepals; the stamens consist of filaments or threads, and anthers or knobs; the pistils consist of styles or pollen-conducting tubes; and stigmas, or heads; the ovaries are one or many celled, and contain the seed or seeds.

What is that yonder, so delicately green and glossy? A fern? No. A flag? No, no. It is the Cuckoo pint, or Wake-robin, *Arum maculatum*, the leaves of which (hastate or sagittate), you must observe, closely resemble those of the "trumpet lily" of the cottager's window, the *Calla Æthiopica* of gardeners. You will never forget it now, for we have no other plant like it; even the hart's tongue fern, which you thought of when you first saw it, is as unlike it as can well be. I shall never forget it, I can tell you; for, when a boy, a playmate, who professed to know all the "herbs" and their several qualities, persuaded me to eat a leaf while he ate one too, and we were both nearly poisoned, and suffered horribly for hours as if we were being choked with red-hot coals. Oh! how we gargled our mouths with the dirty water of a pond, and bellowed with pain, and gave ourselves up as lost, and actually foamed at

the mouth, and raved as if mad, as perhaps we were for a time ! I shall never forget it. Yet what a pretty thing it is, fringing the damp hollow now with its bright



ARUM SPATHE.

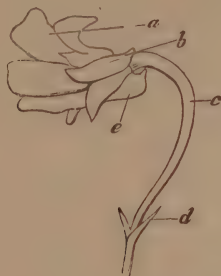
Including essential organs of plant reproduction ;
a, stamens ; *b*, pistils.

green spotted leaves, and how much more beautiful will it be later on in the season when it presents to view its brave spike of scarlet berries, and becomes then to the

children the much-renowned "lords and ladies." The French call it *Bonnet de Grand Prêtre*, the Germans *Aronswurz*. In a short while hence this arum will be in flower, and will afford a good subject for observation. It has no proper corolla, but a kind of sheath called a *spathe*. The white trumpet of the trumpet lily is not a corolla, but a spathe. Within this spathe is a club-shaped *spadix*, shorter than the spathe, bearing upon it two sorts of flowers, which look unlike flowers, but in truth are so, for the lowermost consist of ovaries with stigmas, and the next above them consist of stamens, and these three organs are sufficient for the multiplication of the species, the lowermost of the series producing the berries or seeds by which the plant is perpetuated and increased. The little ring of scales at the immediate base of the purple club appears to consist of abortive ovaries, as if, under more favorable conditions of life, the stamens or gentlemen would have ladies on each side of them, and could say in freeness of choice, "How happy could I be with either," without wishing "t'other dear charmers away."

To leave the wood without finding a violet would be to lose an opportunity. Well, have we not several times in this short ramble walked over yielding pavements of them and held our speech for several seconds at a time in admiration of their beauty, and joy of their delicious odour. We must not say a word as to the beauty of the flower, and must actually be content with one quotation of poetry to close this chapter. Here, however, is a diagram of a violet to show that in construction it differs but little from its boon companion

the primrose. There are five petals, one of which is prolonged into what is called the "spur," five sepals,



FLOWER OF VIOLET.

a, Corolla; *b*, calyx; *c*, peduncle or flower-stalk;
d, bracts; *e*, spur of corolla.

five stamens, one pistil, and one ovary. The quotation shall be from Wordsworth.

She dwelt beside the untrodden ways
Beside the springs of Dove,
A maid where there were none to praise,
And very few to love.

A violet by a mossy stone
Half hidden from the eye!
Fair as a star, when only one
Is shining in the sky.

She lived unknown, and few could know
When Lucy ceased to be;
But she is in her grave, and, oh,
The difference to me!

CHAPTER V.

THE FLOWERS OF APRIL.



HEY are as numerous as the stars of heaven, and like the milky way in heaven they make a glowing girdle round the earth.

Stars they are, wherein we read our history,
As astrologers and seers of eld ;
Yet not wrapped about with awful mystery,
Like the burning stars which they beheld.

Yet plentiful as flowers will be before the month is out, we must wait awhile ere the world will appear to be covered with them, for the moorlands are as yet black as ink where heather rules, and black also in the groundwork where the furze or whin predominates, but here the black ground-work is patched with blazing gold, and the watercourses are all marked out distinctly with lines of new greenery amidst which flowers of many kinds may be found. The cultivated lands are fast brightening to the magical touch of spring, and four good pioneers lead the way for the "rosy-footed hours," to dance their first gay measures on the mead on days when the sun shines brightly and the keen east wind 'is stilled for a season, and the honey-bees make music on the fruit walls and in the orchard. in the

delusive belief that summer has really come. The four pioneers are first the Dandelion, which as a rule takes the lead and makes a glorious show on every sandy bank and neglected spot of ground. Next comes the Daisy, *Bellis perennis*, dotting the grass lands with its snow-white stars. Instantly upon the first general gleam of daisies, appears the Cuckoo flower, *Cardamine pratensis*, the appearance of which gives the signal, not only for the cuckoo to sing, but for the buttercups to blow. When the cardamine is first in flower, we shall find only a single buttercup here and there in the meadows, but we know that a host are coming, and very soon the pastures will be true fields of cloth of gold. There can be no need to describe any of these except the cardamine, and that may be identified most easily and will never afterwards be forgotten. It is a humble but cheerful plant with conspicuous white or very pale lilac flowers (cruciferous) like those of a single stock, and pinnated leaves which may be likened to a comb; the seed-pods narrow and long. It is evidently a member of the long-pod division of the great family of cross-flowered plants, very many of which are edible or pungent, or aromatic, and productive of cheerfulness one way or the other to many forms of animal life. You may taste the leaves with safety, you will find them pungent, and will be able to guess that they impart a spicy relish to the hay and help the cattle to enjoy their dry winter provender. This is the "lady smock all silver white" of Shakespeare, in many districts renowned for the pure whiteness of its flowers and their extreme profusion in the April landscape, which appears as if

covered with linen put out to bleach. It is pre-eminently a plant of the fat lands, the sandy waste and the grim moorland know it not; the buttercups that follow it in the pastures belong to the fat lands too, and the wise man who buys a "parcel of land" will prefer a tract on which these plants will grow rather than one covered with dandelions, docks, or drabas.

Let us look about us and we shall see in the old hedgerows and on the skirts of woodlands the white blossoms of the sloe, *Prunus spinosa*. This is the "black thorn" of the countryman. You cannot well mistake this for the "white thorn" or "hawthorn," for that will not bloom until at least a month later, and in a very backward season we may wait for the white thorn until June. You may be able to sing as you go on your journey that sweet old song—

From the white-blossomed sloe
My dear Chloe requested
A sprig her fair breast to adorn.

If you will remember that the sloe is in its affinities a rose, and will observe how its tiny white flowers resemble roses, that may be enough as a note of observation for the present. Now observe at your very feet a lovely blue flower; it is heavenly blue, and its handsome notched heart-shaped leaves add considerably to its beauty. What is it? A forget-me-not? No. A pimpernel? No. It is the Germander speedwell, *Veronica chamædrys* (Plate 8), the "eye-bright" of the village botanist, and to the poet the

. . . . Flower whose hedge-side gaze
Is like an infant's.

The speedwell may afford us a pretty lesson, at all events, in one particular, for its flowers are irregular in form, one segment being smaller than the rest. This is the loveliest of its race amongst our wildings, a perfect jewel among field flowers ; but in the garden are to be found grander species of *Veronica*, though there are none we should sooner love. Not far off you may be sure are several other species closely allied to the



COROLLA OF GERMANDER SPEEDWELL.

'a a, The stamens attached to the corolla.

Germander speedwell. A charming little thing is the Ivy-leaved speedwell, *V. hederifolia*, with pretty leaves, lobed like those of the wild ivy, thick in texture and of a fine green hue ; the flowers are intensely blue, but smaller than those of the "flower of the flock." A commoner species than these we shall, perhaps, not find in the hedgerow, but we are almost sure to find it in the garden, making patches which may be likened to dusty chickweed in the leaves, and the flowers are pretty, but rather suggesting a washed-out blue than a tint of the

sapphire. It is the common speedwell, *V. officinalis*, a very variable plant, sometimes downy, sometimes smooth, yet always recognisable when once fairly known in any of its more distinctive forms. You may like to try it as a tea-plant, for in old times an infusion of the leaves was a favorite beverage, and some good and wise men have pronounced it a more wholesome source of tea than the leaves with which the Chinese supply us. Equally common is the Grey speedwell, *V. agrestis*, which our hedgerow will probably supply in as great abundance as the garden. Generally this has one white segment in its tiny peep-eye flowers, by means of which it may be distinguished.

On the bank where the sloe is imitating a snowdrift we shall probably find the Ground ivy, *Glechoma hederacea*. If you do not happen to know it, there will be no harm in the remark that it is not an ivy at all, and only remotely resembles ivy, being a true labiate or lip-flowered plant. It is a lowly, much spreading trailer, with heart-shaped leaves and whorls of deep lilac flowers. When bruised the plant emits an agreeable odour suggestive of those wholesome properties for which it was once so highly valued as a medicinal herb. On the self-same bank you may look for the brilliant flowers of the Red campion, *Lychnis diurna*, a smallish, but bold-looking catchfly, with bright purplish-pink flowers, and leaves like those of some gigantic chickweed. You may well mistake this for its near relative, the Ragged Robin, *Lychnis flos-cuculi*, which, however, is readily distinguished by its divided petals, every one of which is deeply 4-cleft. This last

you may again confound with the Herb Robert Cranesbill, *Geranium robertianum* (Plate 2), which, however, is a most delicate plant in its several and separate features, though coarse enough in the mass sometimes. The Herb Robert has light green, deeply divided leaves, and extremely neat, lively pink flowers, and seed vessels so closely resembling those of the green-house



WILD GERANIUM (HERB ROBERT).

a, Petals; *b*, calyx.

PETAL OF WILD GERANIUM.

a, Limb; *b*, claw.

geranium (Pelargoniums of the botanist) that by this mark you may know a true geranium for all time. We are amongst the flowers now, and no mistake! There are thirteen geraniums in the British Flora, all of which are distinguished from the Pelargoniums—the Geraniums of the garden—by their regular corollas, the pelargoniums having always two distinctive top petals, less distinctive, however, of late years, owing to the labours of the florists to equalize the petals, in which they have been so successful that some of the “scarlet geraniums” or “zonate pelargoniums,” as “Richard Headly,” and “Thomas Moore” for example, present us with scarlet flowers in which it is next to

impossible to discover any difference at all in the size of the petals.

But let us go on towards the lower grounds, where the watercourse has marked itself out with a line of willows, and alders, and rushes, and coarse grasses, and has persuaded a host of lovely wildings to abide near it on the moist slopes, to comfort the dickey birds when they come to bathe and drink. On yonder bough the song-thrush—mute just now—is performing his toilette after having taken a refreshing dip. His nest is somewhere near, and his mate is sitting close upon her eggs. You may know that by his endeavours to keep up an appearance. He will scarcely sing a note until the eggs are hatched, and then he will trill away as if life itself was to become a mere song, as it was to him in his days of gallant courtship. Will he sing for mere joy or to teach his little ones, think you? I give it up. But here is a flower you know full well, the wild Heartsease or Pansy, *Viola tricolor*. Here another, the smallest Forget-me-not, but not the true flower of that name. It is otherwise known as the early Scorpion Grass, *Myosotis collina*; the flowers are small and of course bright blue. Here another, and one well worth finding, the Butter-bur, *Petasites vulgaris*. The flowers of this plant, like those of the coltsfoot, appear in advance of the leaves; they are borne on a peculiarly thick, fleshy stem, clothed with swelling leaf-stalks, which appear to fail of their purpose in producing leaves, for they are leafless or terminated by small apologies for leaves. The flowers are in a cluster at the summit like a bunch of small, round, flesh

coloured or pale pink buttons. The plant belongs to the composite order and is therefore a relative—though remote—of our friend the dandelion. As the flowers change to tufts of feathery seeds the true leaves appear, and soon attain to a greater size than those of any other of our wild flowers. If, therefore, you do not find that plant now by its flowers, you may find it in your next ramble by its immense leaves, which are heart-shaped at the base, and in general outline make an irregular triangle, broadest across the base.

Once more let us try the woodlands for wild flowers. The air in the green meadows and along the water-courses was cold and gusty. Now we are nearing the wood we seem to have found a better climate; the air is calm and warm, and mildly spicy with the diffused odours of many flowers. William Cobbett, in his ‘*Rural Rides*,’ has a passage on woodlands which might be quoted ten thousand times without losing its freshness. He says, “Woodland countries are interesting on many accounts; not so much on account of their masses of green leaves, as on account of the variety of sights and sounds and incidents they afford. Even in winter the coppices are beautiful to the eye, while they comfort the mind with the idea of shelter and warmth. In spring they change their hue from day to day during two whole months, which is about the time from the first appearance of the delicate leaves of the birch to the full expansion of those of the ash; and, even before the leaves come at all to intercept the view, what in the vegetable creation is so delightful to behold as the bed

of a coppice bespangled with primroses and bluebells? The opening of the birch leaves is the signal for the pheasant to begin to crow, for the blackbird to whistle, and the thrush to sing; and just when the oak-buds begin to look reddish, and not a day before, the whole tribe of finches burst forth in songs from every bough, while the lark, imitating them all, carries the joyous sounds to the sky."

We shall find in the woods better flowers than the garden can show us, and all of them grown in a more skilful way. We put our tufts of narciss and squill in open plots of common soil exposed to the sun, the east wind, and the night frosts; but Nature plants hers on the margins of the woods and in the hearts of thickets amongst the mellow soil of decayed leaves, with a sufficiency of last year's leaves to comfort them, and with shade from the sun and shelter from the blast. No wonder, then, that the sheets of bluebells that appear to be dancing in companies along the woodside, and the tufts of daffodils that assort themselves in conversational groups, and the delicate fringes of oxalis that cluster along the slopes where dead fern fronds tell us there will be something else worth looking for later in the season, are all more fresh, more bright, more stout and bonny than the best of their several kinds the gardens can show us.

The only British species of hyacinth is now in perfection, and almost every copse and woody field-path is coloured with its nodding bright bluebells. This is the Bluebell hyacinth, *Hyacinthus non scriptus* of Linnæus, *Agaphis nutans* of modern botanists. There is a story

attaching to the name bestowed by Linnæus, as happens in many other instances in which the master of scientific terminology called fancy and erudition to his aid in naming animals and plants. The gardens can show us white and pink varieties of the bluebell hyacinth, but they are rarely met with wild.

Closely related to it is the Starch Grape Hyacinth, *Muscari racemosum*, a sweet little thing blooming a fortnight later, the flowers small and shaped like the old-fashioned watch-seals, wanting the recurved segments of the hyacinth, the floral reminders of the curly locks of Hyacinthus. The grape hyacinth is frequently grown as a very choice, cool, greenhouse plant for the sake of its early and delicate flowers. It may be found wild in the fields about Caversham, Suffolk, where probably it is but a runaway from the garden. There are three species of narciss registered as natives of Britain, but the Daffodil, *Narcissus pseudo Narcissus*, is the only one which a wandering botanist of ordinary diligence is likely to meet with. The daffodil is not uncommon in moist woods in the southern and western parts of England, but is less plentiful than blackberries. The Poets' Narciss, *N. poeticus*, appears occasionally as a wild plant in sandy fields in the east of England, and is certainly a rarity. Still more rare is the pale two-flowered Narciss, *N. biflorus*, being met with in a few places only in the south of England, and in the neighbourhood of Dublin. There are some fifty or more species and varieties grown in the garden, and that is the place to study the family. What a pity we do not often meet with collections of interesting hardy plants instead of

ephemeral flimsy things ten thousand times repeated in the grounds that embellish our rural residences! Fashion, however, was never much of a friend to knowledge; hence, to follow the fashion does not require any considerable amount of brains.

Now we have returned to the garden it may be well to cut for dried specimens a few sprigs of currant and gooseberry flowers, for these are true natives that still linger as wildings in a few places. The tasteless mountain currant, *Ribes alpinum*, may be found on the mountainous lands of Yorkshire and Durham, and is worth looking for because, being utterly worthless as a fruit, it has never been grown as a garden plant. It very closely resembles the red currant of the garden.



FLOWERS OF COMMON RED CURRANT.



Common Wood Anemone



Red Anemone



Red Anemone



White Anemone



CHAPTER VI.

THE FLOWERS OF MAY.



HAT particular flower was in the minds of those who contributed somewhat to the founding of the great American republic by naming a ship that afterwards became famous, the "May Flower?" A pretty query that, perhaps, for the speculative, but a narrow one, for doubtless if we are to select a flower and call it *the* May flower with emphasis, it must be either the Buttercup or the Hawthorn. These are pre-eminently flowers of May. It would seem as if we had been transported unawares to some other planet if we did not see either of them in the course of the merry month. This is indeed the "merry month" "when bees from flower to flower do hum," and the gold of the meadows and the snow of the hedge-rows help materially in the excitement of its merriment. The fields are full of buttercups, and those ambitious botanists who have not yet made a beginning in systematic study may advantageously begin now, for the buttercups have this post of honour in the "natural system"—that they constitute the first order; and the student must master the characteristics of the buttercups in respect of structure

and relationships, as the very first step towards a systematic knowledge of plants.

The many systems of botany may be reducible to two for our present purpose. The Linnæan, or Artificial system, is simply not a system of botany at all: it is a system of botanical mnemonics. The classes and orders are founded on the numbers of the stamens and pistils, and on some few other purely mechanical or numerical characteristics of the organs of reproduction. The system itself may be mastered in an hour by any mind of ordinary capacity; but to apply it is another matter, as the application consists in the practical study of plants—a study in which the system affords absolutely no help at all. Several of the Linnæan classes and orders have better conditions of cohesion than mere mechanical and numerical signs can afford, but that is, so far as the system is concerned, an accident and not a merit. Thus, in the Linnæan system nearly all the grasses come together in Class III, Orders 1 and 2, having three stamens and one or two pistils. But the sweet-scented vernal grass has a place in Class II, Order 2, having two stamens and two pistils. There are many exceptions of like nature, but the system must not be blamed on their account, for it does not profess to do more than find a pigeon-hole for every plant on the face of the earth; and if plants closely related get into pigeon-holes far apart it cannot be helped, and at all events we know where to find them whenever they are needed for a better arrangement.

Now this better arrangement the Natural system purposes to effect by grouping plants in orders, families,

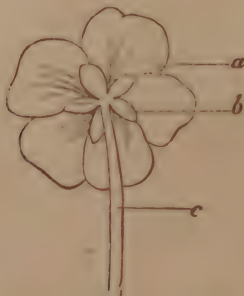
classes, and so forth, according to their obvious affinities, so far as those affinities can be understood. Thus, to begin with, it is a sensible procedure to group all the buttercups in one order, and, as above remarked, in all the now-accepted natural systems, the *Ranunculaceæ*, the



LEAF OF COMMON BUTTERCUP (*Ranunculus repens*).

buttercup or crowfoot tribe, constitute the first order, and the one which therefore demands the first attention of the student. In this order we find the buttercups, the clematises, the anemones, the adonis, the globe flowers, the hellebores, the columbines, the larkspurs,

the aconites, the pæonies, and a few other less important tribes. They are grouped under *Ranunculaceæ* because of certain properties which they have in common. Thus the flower of any one of them has usually a calyx of five or six sepals; a corolla of five or six petals; many stamens inserted *on* the receptacle; many ovaries; watery (as distinct from milky) juice; acrid and poisonous properties. The poppy family comes very near to the buttercup family, but you will find by observation



BACK VIEW OF BLOSSOM OF COMMON BUTTERCUP

(*Ranunculus repens*),

a, Petal; *b*, flower-cup, in five sections; *c*, peduncle.

that, instead of figure 5 ruling the construction of the flower, the figures 2 and 4 rule, the sepals being usually two and the petals four, while, instead of a watery, they exude when wounded a milky juice. You may judge by these few particulars that in the study of the natural system every separate fact becomes in its turn a key, a royal road, a finger-post, or a magnetic telegraph to some other fact, or perhaps to a bigger bundle of facts than

the memory can catch hold of at a first effort, though they may be most clearly brought before it by the aid of principles that appear to be irrefragable. We must not, however, consider it a fault of the natural system that it offers us at every intellectual meal more than we can hope to digest, because we might apply that principle to material things, and blame the butcher if he ever sent a joint in which there was an ounce of meat more than could be eaten at one sitting.



SECTION OF BUTTERCUP BLOSSOM.

a, petal; *b*, stamens; *c*, pistils; *d*, flower-stem, or peduncle; *e*, receptacle.

We have many more species of crowfoots than the beginner in botany would imagine. The most plentiful of all is the Creeping Buttercup, *Ranunculus repens*, the buttercup of the meadows. The leaves near the root are marked with a dark spot in the centre, the flowers are glossy and plentiful, and of the fullest tint of yellow, the root is fibrous with a tuberous base, and from the base of the stem go forth many creeping scions which put out roots from the joints.

The following species of *Ranunculus* are worth hunting for now. The Ivy-leaved crowfoot, *Ranunculus hederacea*, showing its first flowers late in the month in marshy places. The leaves are kidney-shaped; the flowers white; the stem puts out roots at almost every joint. The water crowfoot, *R. aquatilis*, is well known; but if you never once noticed it, you have but to look out for its white flowers on rivers and ponds to make sure of knowing it the first time you see it. The leaves that lie on the surface of the water are boldly lobed; those that are submerged are cut into fine divisions like curly hairs of a dark green colour. The Floating-water Crowfoot, *R. fluitans*, which resembles the last in habit, but differs in having its leaves much elongated and divided, and the stem very long and round. The flowers are white. The Lesser Spear-wort, *R. flammula*, another of the marsh inhabiting species, varies much in character, but always produces many yellow flowers and leaves that vary in form from linear to ovate, very different indeed to the leaves of the meadow buttercups. The wood crowfoot, Goldilocks, or Golden-haired buttercup, *R. Auricomus*, inhabits woods and shady places, producing a few yellow flowers and two sorts of leaves: those at the base roundish, heart-shaped, and thrice divided; those on the stem cut into linear segments—or say—resembling fingers. The Upright meadow crow foot, *R. acris*, produces an abundance of beautiful yellow flowers, which contribute largely now to the splendour of the pastures. It is a true buttercup, with fibrous root, a stem one to two feet high, and hairy leaves deeply lobed and cut. The Creeping crowfoot,

R. repens, is extremely common in pastures and waste places ; the radical leaves are usually stained black or



FLOWER OF BULBOUS-ROOTED RANUNCULUS, BACK VIEW.

a, petals of expanded blossoms; *b*, reflexed calyx, or flower-cup; *c*, blossom half expanded, the flower-cup not yet turned back; *d*, peduncle, or flower-stem; *e*, bract or flower-leaf.

brown in the centre ; the flowers are numerous and of a beautiful golden colour. The Bulbous crowfoot, *R.*

bulbosus, is the "buttercup" *par excellence*, the most plentiful species of all. The root is usually of a grey colour, and resembles in form and size a turnip radish. The flowers are large and, of course, of a bright golden yellow.

The anemones are, as noted above, members of the ranunculaceous order, and very like a ranunculus, too, in aspect, is the Yellow Wood Anemone, *Anemone ranunculoides*, but the flower is starlike in form, and resembles somewhat that of the *Ficaria*. This, however, is a scarce species.

Very plentiful is the common Wood Anemone, *A. nemerosa*, with its tripartite leaves and pretty white or pale pink flowers.

The Blue Mountain Anemone, *A. apennina*, is a questionable native, and more likely to be found in the choice garden where hardy plants are valued than on any of our mountain ranges; but it is recorded to have been found near Berkhamstead, Herts, and near Luton Hoo in Bedfordshire.

The Pasque Flower, *A. pulsatilla* (Plate 2), is not plentiful, but somewhat widely distributed; so a search for it on a chalk-down, or dry pasture, may not prove a mere wild-goose chase. It may be instantly known by the merest novice, so distinct is it in character; the flower bell-shaped, and of a dull violet hue, the leaves all springing from the root, and cut into narrow segments. It is but a step from these to the Pheasant's Eye, or Corn Adonis, *Adonis autumnalis* (Plate 1), which begins to flower during May in the open fields, and will continue flowering until October.

It is impossible to hunt in a good country now without finding some of our native orchids, the characters of which will perhaps equally delight and puzzle the young botanist. On Plate 3 are representations of the monkey Orchis, *Orchis macra*; the Pyramidal Orchis, *O. pyramidalis*; the Bee Orchis, *Ophrys apifera*, an extremely handsome imitative flower; and the Spotted Palmate Orchis, *Orchis maculata*, the best known of all, and not the least beautiful.

As we have near upon forty native species of orchids, the beginner in field botany must not expect to make acquaintance with the whole of them without exercising much patience and perseverance. They haunt copses, hedgerows, chalky downs, quarries, and railway cuttings. A few of them are beautiful, many of them are curious, all are interesting, and indeed there is not in these islands a tribe of plants more worthy of attentive study, both for their intrinsic merits as constituents of the British Flora, and their relations to the more gorgeous orchids of the tropics which we cultivate with so much care in our hothouses.

If we were attracted to the copse by the orchids, we might not deem it waste of time to gather a tuft of Woodruff, *Asperula odorata*, both for its elegant clusters of white flowers, and the delightful odour it will impart to linen, books, &c., if placed amongst them while fresh and there left to wither. Its whorled leaves afford a sufficient character for readily determining it, independent of its neat little compact, wax-like, white flowers.

The orchids constitute a large group of plants, notable in popular estimation for the various resemblances

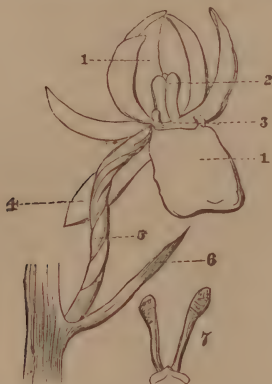
of their flowers to insects, birds, and even larger animals. Ours are the very humblest of the family, but from them we may learn useful lessons to aid us in the investigation of the whole race, or, at the very least, to enhance our enjoyment of the lovely *Dendrobies*, *Oncids*, and *Cattleyas* of the garden. Every orchid flower consists hypothetically of fifteen parts, namely, three



LEAVES OF COMMON WOODRUFF, ARRANGED IN A WHORL.

sepals, three petals, three stamens, three pistils, and three carpels. But the several genera exhibit every imaginable variation of the hypothetical characters. Thus, the labellum, or lip, which is in many instances the largest, most highly-coloured, and most prominent feature, is but one of the petals curiously modified.

The three sepals are usually equal in size and shape, and therefore easily determinable. Instead of three stamens there is commonly only one produced, and this is usually combined with one or more pistils, forming what is called the column. In the noblest of the British orchids, the Ladies' Slipper, *Cypripedium calceolus*, two stamens are fully developed, and the third occurs in a sterile condition between them forming the column.

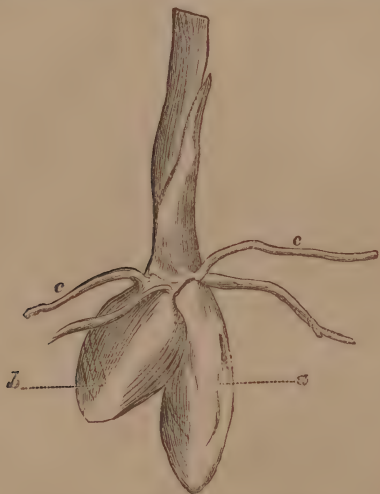


COMMON PURPLE OR MEADOW ORCHIS.

1 1, pieces of the perianth, comprising both sepals and petals; 2, pollen pouches; 3, stigma; 4, spur; 5, twisted ovary supporting blossom; 6, bract. 7, Waxy pollen masses.

One of the commonest orchids in flower now is the Common Purple or Meadow Orchis, *O. mascula*, which has a succulent stem tinged with purple, glossy green leaves spotted with purple, and showy spikes of pale lilac, or rich reddish purple flowers, the lip spotted with white. They emit during the day a pleasing perfume,

but at night are too strongly scented to be agreeable. Each flower rises from a twisted ovary which serves the purpose of a peduncle, and has a long spur turning upwards. The roots of this plant are as interesting as the flowers. The plant springs from a tuber, which, being rich in starch and the source of a highly nutritious substance called "salep," or "salop," we may regard as



ROOT OF EARLY PURPLE ORCHIS.

a, exhausted tuber ; *b*, fresh tuber ; *c*, fibres of root.

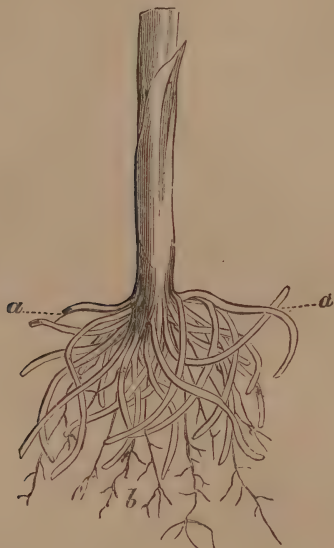
a miniature potato. In common with most other tubers, that from which the plant of the season is produced, perishes as the plant attains maturity, but is succeeded by another which grows on one side of it, and attains its full size long before the exhausted tuber disappears. One of the consequences of this mode of reproduction

is that the plant of this season is about half an inch distant from the spot whereon its parent of the previous season grew, and this, therefore, is a travelling plant. The Dwarf Dark-winged Orchis, *O. ustulata*, is common now on chalky pastures, and especially in the neighbourhood of Dover and Folkstone. It is a tiny thing with deep green leaves, and a spike of flower buds that looks as if burnt; but when the flowers expand, their large white lips may be likened to laughing faces peeping out from dark hoods. The Common Tway blade, *Listera ovata*, has no beauty, but it is well worth looking for in copses and on the shady borders of pastures. It has two broad glossy green leaves three to four inches long, placed half way up the stem, and a number of insignificant yellowish-green flowers. A more remarkable species is the Bird's-nest Orchid, *Listera nidus-avis*, which has a weird aspect, and once seen will never be forgotten. The flowers and the flower-stem are of a dingy brown hue—a flower for witches much more than fairies. The root repeats in a more complex form the characters of the meadow orchis, consisting of tubers which produce young plants in the following season.

The Military orchis, *O. militaris*, is an inhabitant of chalky hills, and common in the midland counties, wherever such hills occur. It closely resembles the monkey orchis, but has more colour, the helmet being of a pale ash colour, the tip rosy purple with spots.

Everywhere now we see upon shady banks the lovely white flowers of the great Stitch wort, *Stellaria holostea*, which may be called a large and grand edition of the common chickweed with a capacity for climbing, for it

towers up amongst robuster plants by the aid of its rough leaves and stems. At the slightest touch the stem snaps asunder ; hence it is often called, by country people, "All-bones : " it also bears the name of "Cuckoo flower," indeed we have several so-called cuckoo-flowers,



ROOT OF BIRD'S-NEST ORCHIS.

a, fibre-like tubers ; *b*, fibres or rootlets.

a sufficient answer to such as protest that vulgar names are enough and Latin names more bother than they are worth. Mixed with it, perhaps, may be the glorious flowers of the Garlic treacle mustard, *Sisymbrium alliaria*, a coarse plant with large, light-green, heart-shaped leaves, acutely toothed ; and terminal

heads of small, white, cruciferous, flowers. If any doubt about the plant when you find it, taste a bit ; you will find it pungent, and the odour of garlic is unmistakeable if the plant is brushed over with the hand.

In the field paths the Knot-gross, *Polygonum aviculare*, is now showing a few of its pretty pink flowers, a member of the Persicaria order ; a troublesome plant to the farmer, but making some amends by its nutri-



COMMON KNOT-GRASS MAGNIFIED.

A, side-view ; *a*, perianth ; *b*, membranous bracts. B, Front view ; *a*, triple styles. C, Style much magnified.

tious qualities and the partiality of sheep for it. On old walls and on rocks may be found the Yellow Fumitory or Common Corydalis, *Corydalis lutea*, which is also a favourite on the garden rockery and one of the best known of garden plants. The Woodsorrel, *Oxalis acetosella* (Plate 2), haunts shady places, where it may be quickly found by its beautiful tufts of delicate thrice-divided leaves, like spiritual clover leaves, and delicate white flowers which are marked with fine pencil-like lines. Lastly, to complete the May garland, bear in

mind to hunt the woods well for the Herb Paris, *Paris quadrifolia*, a most elegant and peculiar plant allied to the Smilax, which you may as easily determine when you find it by the aid of the subjoined figure, as by the most elaborate description.

“The honeysuckle round the porch has woven its wavy bowers,
And by the meadow-trenches blow the faint sweet cuckoo flowers,
And the wild marsh-marigold shines like fire in the swamps and
hollows grey ;
And I'm to be Queen o' the May, mother, I'm to be Queen o' the
May.”

TENNYSON.



HERB PARIS.

CHAPTER VII.

THE FLOWERS OF JUNE.



AS the summer advances the flowers change their places like the stars in heaven. From the fields and the copses they seem to be travelling to the mountains, to the great lakes, to the rocky wildernesses, and the lands deserted by all save them. There are flowers in the meadow now whether the grass be rising fat and flowery for the scythe, or be already closely shorn, and the fragrant harvest lying in heaps around, while a new green blade is springing, and needs but one shower to bring forth again upon the even mead the delicate greenness of the spring. Flowers, indeed, are plentiful everywhere, but a host of elegant things that lighted up the hedgerow and the meadow have departed, but the heath lands and the rocks are sweetly dotted with the fresh growth of ferns, and the waters are newly fringed with their own peculiar forms of vegetation.

Glancing again at the hedgerows and gardens we shall find many flowers yet in their prime that belong rather to May than June. Prominent amongst these are several of the Borage tribe, renowned for the fine tones of azure and amethyst in their flowers, and the

presence in sensible quantities of nitrous salts in their juices. One well worth searching for, and as likely to be found in the cottage garden as the field, is the Lungwort, *Pulmonaria officinalis* (Plate 5), with spotted leaves, lively pink buds, and bright blue flowers. A near relation to it is the Common Gromwell, *Lithospermum officinale*, which haunts rubbish heaps and dry banks. It grows a foot or more high, and has rough leaves and dirty yellow flowers, which are succeeded by nut-like seeds of a grey colour which deck the plant like so many pearls. The Common Borage, *Borago officinalis*, with its splendid blue flowers, may be regarded as the type of its race, and the student of botany would do well to grow it in the garden, for indeed it is rarely met with wild. It will be found that the flower of this plant consists of a single petal cleft into five divisions forming a proper corolla, with five stamens inserted into the corolla, and alternate with its lobes. On the under side is a calyx of five divisions. The corolla falls in one piece, leaving the calyx complete to protect the seeds. The Viper's Bugloss, *Echium vulgare*, is a robust and rough relative of the borage, and one of the most splendid of all our wild flowers. It attains a height of two to three feet, the flower spike often measuring a foot in length. The flowers occur in a succession of short comb-like tufts, the buds bright pink, the flowers pale blue, or full cobalt blue, or richest violet,—a glorious assemblage of colours that compels us to pardon the rusticity of the plant.

Less interesting, perhaps, but more useful than any other member of the borage tribe, is the Comfrey,



Pyramidal Orchis.



Spotted Palmate Orchis.



Bee Ophrys.



Monkey Orchis.

Symphytum officinale, which may be known by its large light-green leaves, numerous bristles, and clusters of white, yellow, or pink flowers, which remotely resemble in form those of the Solomon's seal, though the comfrey is very far removed from that plant, which, indeed, belongs to the lilies. The comfrey affords excellent food for milch kine, and is in many parts of Ireland cultivated for that purpose. The moist places the comfrey inhabits are the homes of two of the Forget-me-nots, which are also alliances of the borage. The true Forget-me-not is the Water Scorpion Grass, *Myosotis palustris*, a robust leafy plant which fringes the sluggish river, and frequently chokes up the smaller streams, for which it abundantly compensates by the beauty and plentifulness of its pale blue flowers, which are as like turquoises as any flowers can be. There are a few other species of myosotis natives of Britain, not all of them water plants, for some inhabit mountainous regions, and others haunt the woods and the fields. The Creeping Scorpion-grass, *M. repens*, though ranked as a species, is only a poor variety of the last, met with in sour bogs. The Tufted Scorpion-grass, *M. cæspitosa*, is not tufted, but crowded in its growth. It very closely resembles in leaves and flowers *M. repens*, and, indeed, is but a variety of *M. palustris*. The Upright Wood Scorpion grass, *M. sylvatica*, is distinct and beautiful, most beautiful, with oblong leaves and large handsome blue flowers. It is scarce, but may be looked for in dry shady places. The Rock Scorpion grass, *M. alpestris*, is an Alpine form of the last, with smaller flowers. The early Field Scorpion grass, *M. collina*, is a tiny thing,

growing on walls and roofs. It has one distinguishing quality, that the flower buds are never pink as in other kinds. The Common Field Scorpion grass, *M. arvensis*, resembles *sylvatica*, especially when growing in the shade, but is never quite its equal in beauty. The Yellow and



THE TRUE FORGET-ME-NOT.

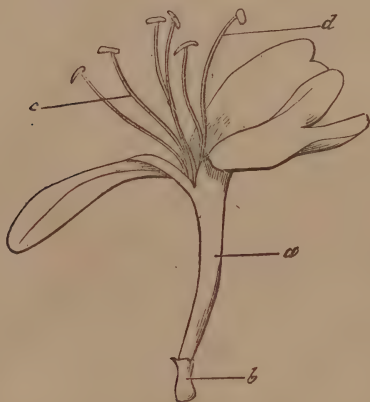
Blue Scorpion grass, *M. versicolor*, is the most distinct of all for the simple reason that its flowers vary from bright yellow to bright pink and bright blue. It is a sweet little thing, by no means rare, and to be looked

for in dry as well as in moist places. The alkanets and the bugloss, which also belong to the borage family, may be better studied in the garden than the field, and it will be a poor garden that does not contain some of them.

Having returned to water scenes we may expect to find the Buckbean, *Menyanthes trifoliata* (Plate 5), a splendid aquatic with noble bright green leaves and elegant pink flowers, which are charmingly fringed. As for the lilies, we have but three, one of which is doubtful. The Great White Water Lily is *Nymphæa alba* of the botanists; the Yellow Water Lily is *Nuphar lutea*. If anywhere in our watery wanderings we should light upon a bog, we might find the two-flowered Linnæa, *Linnæa borealis* (Plate 4), which Linnæus adopted as a crest for his coat of arms, and which, in his own fanciful way and in remembrance of his early struggles, he considered as especially an emblem of himself, "a little northern plant, flowering early, depressed, abject, and long overlooked."

It would be strange if in a June ramble we did not somewhere meet with the honeysuckle, and it would be fortunate to find the two-flowered Linnæa on the same day, for they both belong to the same natural order, the woodbine tribe. In this order are grouped the Elder and Guelde Rose, in addition to the Linnæa and the Honeysuckle, plants that differ immensely in their habits and attractions. In all of them the corolla is in one piece (monopetalous), but deeply cleft as if formed of four or five separate petals; the calyx is attached to the ovary. The fruit is usually a berry, bearing the calyx on its

summit, and the leaves are always opposite. Three species of honeysuckle grow wild in Britain. The Common Woodbine or Honeysuckle of the woods, *Lonicera periclymenum*, is too well known to need description. It is one of the first trees to unfold its leaves, and it wreathes the dark holly and the grey



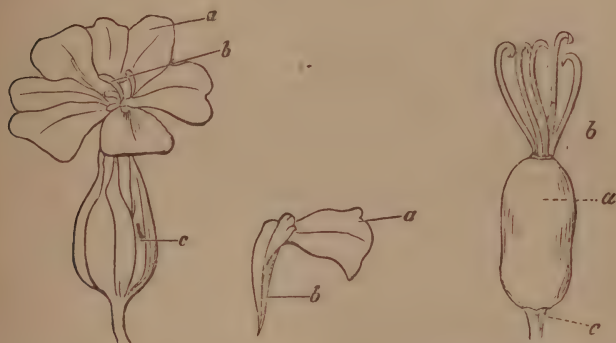
MONOPETALOUS FLOWER OF COMMON HONEYSUCKLE.

a, corolla; *b*, calyx; *c*, stamens; *d*, pistil.

branches of the elm all the summer long with its elegant wreaths of flowers. It is the "woodbine" of Shakespeare, and with him the companion of the wild rose.

"I know a bank whereon the wild thyme grows,
Where oxlips and the nodding violet blows,
Quite over canopied with luscious woodbine,
With sweet musk roses and with eglantine."

Chaucer refers to the same plants under the names woodbine and eglantine; but Milton uses "twisted eglantine" for the sweet brier rose. The dull red berries of the plant have a very poisonous look late in the summer, when they become numerous; they are, however, equally harmless and useless. The Perfoliate Honeysuckle, *L. cuprifolium*, is equally beautiful, but the flowers are paler in colour and the berries are of a bright orange colour. When met with, this may be



BLOSSOM OF LYCHNIS,
WITH PISTILS ONLY.
a, petal; b, pistils;
c, calyx.

PETAL OF LYCHNIS.
a, limb; b, claw.

PISTIL OF LYCHNIS.
a, ovary; b, styles.
c, receptacle.

distinguished by the twofold leaf, or, as the botanist would say, connate leaves immediately beneath the flowers. This belongs to the woods of the east coast, suggesting the probability of its having been introduced from Northern Europe. The Fly Honeysuckle, *L. xylosteum*, is still more scarce. It has egg-shaped

downy leaves and very small pale yellow flowers, which are quite destitute of fragrance.

Amongst the more showy plants of the month due mention must be made of the White Campion, *Lychnis dioica* or *L. vespertina*, which, though usually white, yet varies in colour considerably. It is not only conspicuous by its bold habit and beauty, but is an extremely interesting plant, because hypothetically as a member of the carnation family, the flowers should always contain both stamens and pistils; whereas we usually find the stamens in one flower and the pistils in another. In the language of botany the plant is diœcious. Occasionally, however, both stamens and pistils occur in the same flower.

The lychnis may be allowed to introduce us to the carnation family at large, and it is quite time to hunt for wild pinks, catchflies, corn-cockles, pearl-worts, sand-worts, and stitchworts, though many of them will be bright with flowers until September. The carnations and pinks the florists cultivate are, generally speaking, double flowers, which the botanists have the temerity to call "monsters," in return for which compliment to their favourites the florists pretend that all the beautiful flowers belong to themselves and the ugly ones to the botanists. Well, the Wild Clove, *Dianthus caryophyllus*, belongs to the botanists, certainly, and they need not be ashamed of it on the score of beauty; the florists, with all their grand possessions, cannot beat it. It is the clove gilliflower or July flower of the old gardeners, and doubtless is the parent of the carnation and picotees of the garden. It is probably not a true

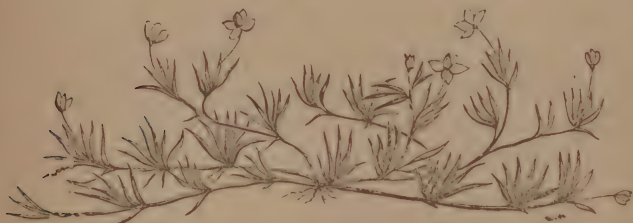
native, but has found its way here from the continent, the southern slopes of the Alps being, without doubt, its original home. Here it is almost confined to the south-eastern parts of England, where it seeks out for itself the grim castles and crumbling walls of the oldest cities, the keep of Rochester Castle having long been famous amongst English botanists for this glorious wilding and its boon companion the snapdragon. The Cheddar or Mountain Pink, *D. cæsius*, is a rare gem met with on the cliffs at Cheddar in Somerset, one of the best possible resorts for a botanical tourist. It is a sweet little gem of a cheerful pink colour. The Soapwort, *Saponaria officinalis*; the Corn-cockle, *Agrostemma githago*; and the stemless Catchfly, *Silene acaulis*, may be found in the garden, perhaps, if not in the field. But we shall scarcely find, under the care of the cultivator, that somewhat coarse but handsome plant, the Bladder Campion, *Silene inflata*, which the children might have been seen eating the leaves of a month ago, when they tasted like green peas. This may be known by its pouch-like calyx. The Ragged Robin or Cuckoo-flower, *Lychnis flos cuculi*, you are so likely to know without help from books, that it is mentioned here only because its beauty forbids silence.

But let us look for humbler relations of the carnation than these. The great Stitchwort or Satin flower, *Stellaria holostea*, has been already referred to as one of the gems of the hedgerow. On the dry pastures and heaths we may find its poor relation, the little Stitchwort, *S. graminea*, which has very narrow

leaves and pretty white, satiny flowers. In the bog is another, the Bog Stitchwort, *S. uliginosa*, with broad leaves and tiny insignificant flowers. The Sandworts are a numerous and puzzling family, but one of their number may be found almost anywhere on the sea-coast, for it loves the rock, the drifted sand, and the salt marsh alike, but it nowhere thrives except near the sea. This is the sea-side Sandwort or sea-side Alsine, *Arenaria marina*, or *Spergularia marina*. The stems are prostrate, the leaves semi-cylindrical, with accompanying white chaffy stipules, the flowers lilac and purple. You may pass over carpets of this pretty plant in rambling amongst the rocks, and yet know nothing of its beauty, for the flowers close soon after noon on dull days and are never open after 4 p.m. The Purple Alsine, *Arenaria rubra*, is a good imitation of the sea-side alsine, but a smaller and less succulent plant, not at all in love with the sea, for it grows on sand and gravel almost everywhere. They are probably two forms of the same species. Closely allied to the arenarias and stellarias are the Mouse-ear Chickweeds, the handsomest of which is the Field Chickweed, *Cerastium arvense*, a plentiful plant in a few districts, usually found on sandy banks in the full sun. It is so like the great stitchwort that it may be easily mistaken for it, but on comparison will be found to differ in many particulars, not the least important being the darker colour of its leaves, those of the great stitchwort being of a most delicate light green. The pretty silvery-leaved plant employed for edging flower-beds, *Cerastium tomentosum*, the "serastum" of the rustic who has picked up a

few garden names, is the prettiest of all the family, and a good type of them too when allowed to become half wild and produce, in spring, its exquisitely finished white satin flowers. It is a native of Southern Europe.

More humble than all these, but equally worthy of notice, are those little tufty moss-like plants, the spurreys, of which we shall select four for special notice. For the first go and search at the foot of an old brick wall, or on a damp cinder-heap, or amongst a lot of plants in flower-pots, for a mossy tuft of bluish-green vegetation, dotted with tiny grey flowers. It is the Procumbent Pearlwort, *Sagina procumbens*,



PROCUMBENT PEARLWORT.

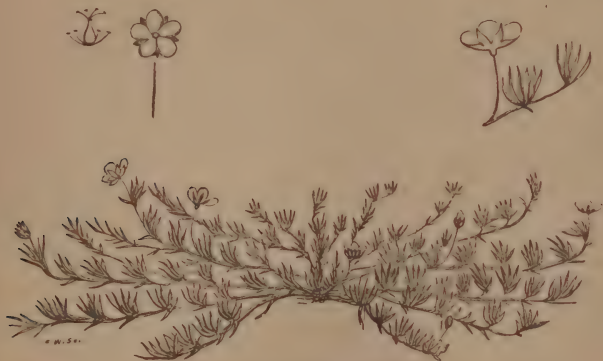
an Alpine plant, which condescends to make itself at home anywhere, and usually prefers to clothe with its glossy-green mossy cushions spots where no other plant could grow. In warm spots on sand and brick it usually remains green all the winter, but is best worth finding while in flower.

A plant very closely resembling it, but quite distinct and far more beautiful, is the Pearlwort Spurrey, *Spergula saginoides*, which occurs in plenty on the Scottish

highlands, and might be sought with some hope of success on Dartmoor, and even on the Bagshot sand. But failing all means of obtaining wild specimens, you may secure tame ones by cultivating the so-called *Spergula pilifera* of gardens, which is merely a large flowering variety of the Pearlwort Spurrey, introduced to English gardens in 1859 as a substitute for grass on lawns. It never acquired any solid popularity, and yet it really does form, when properly managed, the most beautiful lawn imaginable; bright as the best grass newly mown, and soft to the foot as the most luxuriant growth of moss. This plant is of finer texture than the last, the leaves are narrower, and have a more delicate bristle-like point, and instead of tiny grey flowers, it produces comparatively large flowers of the purest white. A large patch of it in full bloom is as pretty a sight as one need wish to see in a day's march. You will have no difficulty, after having studied chickweeds, and sandworts, and stitchworts, in determining that these two plants belong to the carnation tribe, and hence the natural system recognises them as near relations. Yet, because of a little disagreement in their constitutional arithmetic, they are separated by the Linnæan system by six classes, so that to cite only one example of results, if we refer to Deakin's 'Florigraphia Britannica' for descriptions of them, we find the sagina in the middle of the first volume, and the spergula in the middle of the second. The first belongs to Class IV, Order III, having four stamens and four pistils. The second belongs to Class X, Order IV, having ten stamens and five pistils.

There are three other species of spurrey, and two other species of pearlwort. The Corn Spurrey, *S. arvensis*, is known in Norfolk as the "pick-purse," being regarded as an injurious weed, whereas, in truth, it is highly nutritive, and in Holland and Germany is frequently sown with corn in order that there may be plenty of it on the land the following season, when the cattle are turned out on the stubble. The Knotted Spurrey, *S. nodosa*, grows in marshy soils, preferring sandy spots. It is of a wiry straggling habit, and produces large white flowers.

A host of plants will have come under observation while the foregoing studies were in progress. Several of the yarrows may have been found in flower, the most



PEARLWORT SPURREY.

(The detached flowers are natural size.)

common being the Common Milfoil, *Achillæa millefolium*, a valuable pasture plant, and by no means valueless in the garden, for it answers well for turfing hot sandy

banks where grass is sure to be soon burnt up in summer. The "Rosy Yarrow" of the garden border is a variety of the same plant, and one so rare in its beauty, though commonest of the common, that its flowers may be as fairly likened to jewelry as any other flowers that have been so honoured. The wild yarrow is usually



SNEEZEWORD YARROW.

white, but it is by no means uncommon to meet with many shades of flesh and pale pink where the plant grows in plenty. Another pretty kind is the Woolly Yellow Milfoil, *A. tomentosa*, a pretty little Alpine species, with downy leaves and fine tufts of golden yellow

flowers. The favourite British Yarrow of the garden—if the rosy yarrow does not happen to be *the* favourite—is the Sneezewort Yarrow, *A. ptarmica*, with snowy white flowers, and extremely elegant leaves, which grow in a tuft close to the ground, and being finely cut, and of a pleasing tint of green, often cause the plant to be mistaken, when not in flower, for a fern, which it fairly resembles. The double flowering variety belongs especially to the garden. It thrives best in a moist shady spot, but will grow almost anywhere. The yarrows belong to the composite order, and have the bitter, pungent, and peculiar odour by which their near relatives the camomiles and feverfews are distinguished.

Many geraniums or crane's-bills, in addition to the Herb Robert already noticed, will attract our attention during the sunny month of June. A splendid Alpine species, the Bloody Crane's-bill, *Geranium sanguineum*, has many orbicular or kidney-shaped leaves, and a few large solitary flowers of a fine purplish-crimson colour. This you will find in every garden where good hardy plants have the encouragement they deserve. The Dusky Crane's-bill, *G. phæum*, is a strong growing plant, with flowers of a deep, dingy, purplish-black colour. It may be found wild in mountainous woods, and in the garden where such plants are prized. The Wood Crane's-bill, *G. sylvaticum*, grows two to three feet high, with large deeply lobed leaves and flowers growing in pairs, in large clusters at the summit of the plant; they are of a fine light purple colour, pencilled with dark lines. This may be distinguished from all other

British geraniums by the hairs on the stems of the stamens, or in other words, by its ciliated filaments. The Blue Meadow Crane's-bill, *G. pratense*, grows in moist rich pastures in mountainous districts; the leaves are deeply cut, the flowers grow in pairs, they are of a fine blue colour. There is no wild plant to surpass



LEAF OF COMMON DOVE'S-FOOT
CRANE'S-BILL.



PINNATED LEAF OF VETCH.
a, tendrils.

this in beauty when it attains its highest development, but it must have shade and a rich soil to show forth its full beauty. The Dove's-foot Crane's-bill, *G. molle*, may be known by the roundish leaves which grow next the root, and deeply notched petals of a pinkish-purple

colour, though in many of its characters it resembles the small-flowered Crane's-bill, *G. pusillum*, and the Round-leaved Crane's-bill, *G. rotundifolium*.

A common plant on dry wastes and fallow fields is the jagged-leaved Crane's-bill, *G. dissectum*, the leaves of which are cut into longer and narrower segments than those of any other species, with the exception of the one next to be mentioned. The flowers are few, produced in pairs at the top of the plant; they are of a pleasing pink colour usually, but vary considerably, as soil and situation affect them. The Long-stalked Crane's-bill, *G. columbinum*, is like the last in its deeply cut leaves, but the flowers are larger, and borne on peculiarly long stalks, which give the plant a light wiry appearance, in which it differs from all other species. The Stork's-bills are the close allies of the Crane's-bills; they bear smaller flowers, and the fruit has a longer, narrower, and harder beak. The Hemlock-leaved Stork's-bill, *Erodium cicutarium*, is the most common. It is a coarse plant.

By this time, too, the furze and broom have had their share of our admiration, if they have had but little of our attention. They represent the great national order of Papilionaceous plants, so named because of the resemblance of their flowers to butterflies. They are also called Fabaceous because of the peculiar bean-like pods in which their seeds are produced, "faba" being the Latin for a bean. The fabaceous plants rank second only to the grasses in value as ministrants to the economy of animal life, for they produce food for man and beast in vast abundance, and

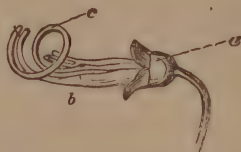
generally speaking, the aliments derived from this family are of the highest character in point of nourishing power, all of them contributing largely to the nourishment, not only of the muscular and bony framework, but in a peculiar degree also to the nervous system, owing to their richness in nitrogen and salts of phosphorus. In a majority of cases the fabaceous or leguminous plants have pinnated leaves, that is to say, each separate leaf consists of a series of symmetrical divisions united by a common stem. In the laburnum, locust, and acacia trees, we find the leaves to be formed on the same plan as in the commonest vetch, for these are all members of the Leguminosæ; but in the vetch the pinnated leaf terminates in a tendril, whereas in all the trees of the family the leaves are destitute of tendrils. An interesting exception occurs in the case of the Judas tree, *Cercis siliquastrum*, which you may find in many a good garden; in this case the leaves are entire and orbicular, but the pretty pink flowers are as like those of a pea as are those of the Common Rest Harrow, *Ononis arvensis*, a pretty low-growing thorny shrub, with rosy-pink flowers, which you may now find on many heath lands and sandy waysides. The Common Broom, *Cytisus scoparius*, may be studied with advantage as a representative plant. The leaves are in threes, and remotely resemble those of the clover, which also belongs to this family. The flowers are formed, like those of the pea, with five petals, so disposed as to serve for the image of a butterfly. The uppermost constitutes what is called the vexillum or banner, those on each side are the wings, and the lower-

most pair the keel. The petals must be stripped off for the full display of the stamens and pistil, which will be found as represented in the figure, the filaments of the stamens being all united at the base. Fertilisation is effected by insect agency, and probably in this way—a bee enters the flower in search of honey, and comes out well dusted with pollen. The stigma of the flower entered is perhaps not so ripe as the stamens in the same flower, and if the bee leaves a dust of pollen on it, no effect is



COMMON BROOM.

a a, petals; *b*, calyx; *c*, stamens;
d, pistil.



CALYX AND ESSENTIAL ORGANS
OF COMMON BROOM.

a, calyx; *b*, stamens; *c*, curved
style.

produced, but the next flower the bee enters may be ready to receive the pollen, and whatever the bee leaves upon it in bustling in after honey takes effect, and immediately afterwards the pod begins to grow. In due time the bush is, by the aid of such agencies, covered with legumes or pods, bearing seeds upon the upper seam of the valves destined to be scattered when ripe by the cracking of the dry legume in the heat of

the sun. While yet in a fresh green state, the remains of the calyx may be found with the dried filaments of the stamens at the base, and the remains of the stigma at the point of the pod. The common garden pea carries the remains of the stigma at the point of the pod, like a chaffy scale, in just the same way.

An immense number of papilionaceous plants are now in flower ; we must mention very few. The Com-



COMMON BROOM.

a, legume, or pod ; *b*, persistent calyx ; *c*, remains of stamens ; *d*, remains of stigma.

mon Furze, *Ulex Europæus*, you know, but perhaps you do not the pretty little Dwarf Furze, *U. nanus*, a very spiny small edition of it, which, from the end of this month until Christmas, will light up many of our heaths and moors with its brilliant yellow flowers. "Not know it," you exclaim in astonishment. Well,

perhaps you do not know it as distinct from the whin of the hedgerow and the sandy waste. Now here is one character by which to distinguish this plant from the common furze—the flower stalks are accompanied with bracts wider than themselves ; in the dwarf furze the bracts are the same width as the flower stalks, moreover the dwarf furze is hairy, the spines and stems are hairy, but in the other smooth. A pretty broom to look for now on mossy lands is the Needle Greenweed, or Petty Whin, *Genista anglica*, a very spiny wiry plant, with pretty tufts of small yellow flowers, which crown it as with golden garlands. The Medick or Lucerne, *Medicago sativa*, you may find upon the farm lands if it does not occur in your rambles far a-field. Its purple flowers cause a great mass of it to present a beautiful feature in the landscape, especially when it occurs in the same scene with acres of yellow mustard and crimson clover. The Yellow Melilot, which is far from common, though by no means scarce in many parts of Cambridgeshire, is well worth hunting for, as, indeed, it is well worth growing in the garden. The spike of flowers may be likened to a brush or comb, as they all turn one way, and form a close fringe of delicate yellow tubes, in which the characteristic features of papilionaceous flowers may be easily traced out. It is to this plant, in part at least, that Gruyere cheese is indebted for its peculiar flavour, the melilot being abundant in the pasturage of Gruyere.

One of the most interesting trefoils is the Hare's-foot, *Trifolium arvense*, with heads like velvet ; the colour of the flowers pale pink, peeping prettily out of

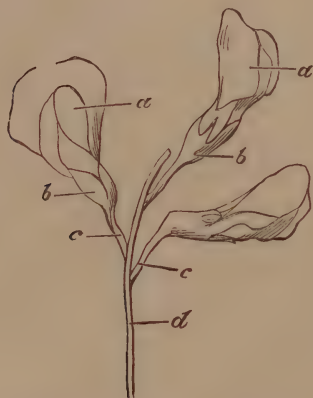
a soft grey down. It loves the neighbourhood of the sea, and you may make sure of finding it on the pastures of Kent, especially near Sandgate. A very pretty kind is the Soft-knotted Trefoil, *T. striatum*, with distinct, small, rounded leaves, and downy heads of reddish-purple flowers. The Strawberry-headed Trefoil, *T. fragiferum*, is really like a strawberry, the head rounded, and consisting of little purplish-red flowers, set amongst conspicuous green calyces. Look for it in the salt marshes of Kent and Essex. Salt marshes are capital hunting grounds, where you may have to hunt oxen as well as flowers, or perhaps the oxen, if you are a trifle too timid, will hunt you. The Lesser Yellow Trefoil, *T. minus*, is an annual plant, quite common in good pastures. It has pretty little heads of yellow flowers.

From the trefoils proper we pass to the Bird's-foot Trefoil, *Lotus corniculatus*, with flowers most distinctly papilionaceous, and remotely resembling those of the laburnum; the seed pods being long and narrow, and in groups of threes, like the foot of a bird. It is well known in gardens, and one of the best of rockery plants. Next the Vetches, and trouble enough they will give you. The Sweet-milk Vetch, *Astragalus glycyphyllos*, is a bold and handsome plant, with larger leaves than we generally meet with amongst the herbaceous members of the pea tribe. The plant is sometimes mistaken for a young Robinia, but it may be distinguished from anything of the kind by its prostrate stem and large dull yellow flowers. The loveliest of the vetches is the Wood Vetch, *Vicia sylvatica*, which

adorns the hedgerows in mountainous woody districts all the summer long, with garlands of blush flowers of the most elegant character. More common, indeed, most common, is the splendid Tufted Vetch, *V. cracca*, which loves to climb through the tangled rough herbage of the hedge, to toss out its showy tufts of purplish-blue flowers at the very summit, and mixes in the midst of brambles and rest harrows on the plain, to adorn them all with flowers that seem to belong to them, but which we need not to be told are not theirs. In the north the Bitter Wood Vetch, *V. orobus*, with cream-coloured flowers takes its place, and grows in the same way. The Common Vetch or Tare, *V. sativa*, may be seen more often on the farm, and in the market cart, than as a wilding, and for that very reason, perhaps, on the principle that familiarity breeds contempt, it is one of the last of our native plants with which a field botanist makes a thorough acquaintance. Equally valuable is the Bush Vetch, *V. sepium*; its dull blue or pink flowers are extremely common in hedgerows, and on the skirts of plantations. It forms a distinct dull green bush with small clusters of flowers, which are followed by an immense number of pods. The leaflets are egg-shaped or elliptic, the pods smooth. It is the least attractive of all the vetches.

The most common of the wild peas is the Meadow Vetchling, *Lathyrus pratensis*, which has large yellow flowers borne on slender stems, high up amidst brake and bush, above which it climbs by the help of its tendrils. The Everlasting Pea, *L. latifolius*, is rarely met with wild, and is probably not a native, though to

be found in woods in Cumberland and Worcestershire. The reader does not need to be told that it is a favourite in the garden, and one of the most beautiful and various of hardy plants known. The Seaside Pea, *L. maritimus*, is rare, and probably not a native. It is well worth finding, both for its beauty and the story of its appearing in great plenty in a season of



FLOWERS OF MEADOW VETCHLING.

a a, petals; *b b*, calyx; *c c*, pedicles; *d*, peduncle.

dearth, and thus helping to mitigate the effects of a general scarcity. It has a very distinct leafage, and roundish heads of purple flowers. It may be found at several stations on the eastern coast of England, and usually on rocky sites far away from either mud or sand. Many more of this great family are flowering now, and scarcely one that is not worth a long journey

to obtain it, and a little patience to determine its name and learn its fame.

Now for the grasses, which are everywhere flowering abundantly. They gleam in the meadow like silver feathers; they sparkle amid the herbage of tangled hollows with their whitish, yellowish, reddish, cloudy sprays of indeterminable beauty; they make the dusty highway cheerful with their humble imitations of oats, and rye, and barley, and they climb to the tops of the old walls, and to every lodge on the old tower, and make greybeards, and hoary seams, and strange scars and splashes on the masonry, to indicate that time despises architectural lines, and can deface them all by the aid of grains of dust that float on the air unseen. One little grass seed wafted to the top of the turret shall suffice, in the course of years, to clothe the whole of some vast ruin with a green tracery of loveliest vegetation, the roots of which shall eat into its very heart, and cause its ultimate return to the dust, out of which, as proud art directed, it originally sprung.

The grasses constitute a great natural order, which bears the collective designation *Graminaceæ*. This order includes all the grasses commonly recognised as such, together with all the grain-producing plants, such as wheat, rice, maize, millet, sugar-cane, &c. They all bear true flowers, which are destitute of proper corollas, and these flowers are succeeded by seeds, which more or less resemble barley, oats, or wheat, except it may be in size and colour, and these seeds usually contain a large amount of nourishing farina,

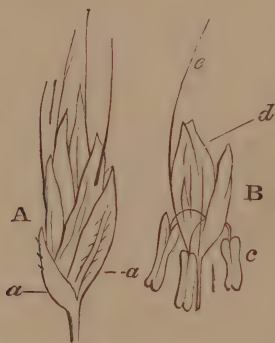
which renders them valuable as food to man or to cattle, or to the little singing birds that trust themselves to God for all in all. In their roots they are not, generally speaking, peculiar, but in their stems and leaves they present unique characters. The stems are cylindrical (never triangular), usually hollow, always jointed, with a leaf at each joint, the leaf proceeding from a split sheath, at the summit of which there is attached a leafy appendage, called a ligule. The grasses grow from within, and belong therefore to the great department of the vegetable kingdom to which botanists apply the collective term "endogens," as distinct from exogens or outside growers, this last division comprehending the larger portion of all the flowering plants known, and of trees especially.

The principal associates of the grasses as endogens are palms, orchids, and lilies, all of which produce flowers, in most cases beautiful, but always in some respects different in plan from the flowers of exogens. We have now to do with the flowers of the grasses, the structure of which should be clearly understood by any one who entertains a hope of enjoying the pursuit of field botany. Putting aside exceptional cases it may be said that the flowers of grasses always contain stamens and pistils, or that the stamens are in one set of flowers and the pistils in another. A splendid example of the separation of the sexes occurs in the maize or Indian corn. The female flowers are produced at the joints on the incipient cobs, and the males in the form of a tuft of silken threads, or, indeed, more like spun glass at the top of the plant, "the plumes of Mondamin." The

stamens and pistils are usually enclosed in chaffy husks or glumes, which constitute the most conspicuous feature of the inflorescence. These glumes or chaffy scales, of which every flower (where glumes are present) has two, are usually dissimilar and are called glumellas; on the outer one is produced the awn or bristle which characterises the flowers of some of the grasses. Every separate group of flowers forms what is called a



FLORET OF MELIC GRASS,
showing feathery
stigmas.



A, Spikelet of Brome Grass; *a a*, glumes or involucre, inclosing grass florets. B, Single floret of Brome Grass; *d*, glumellæ, or perianth; *c*, stamens; *e*, awn.

spikelet, and every aggregate of spikelets constitutes the spike or panicle.

There are forty-four genera of British grasses and about 120 species. Very many are so nearly alike that no beginner could hope to distinguish them even were they to be met with in his earliest rambles, but the beginner may, nevertheless, find a great many and very

quickly understand them sufficiently to hunger for knowledge of more.

The sweet-scented Vernal-grass, *Anthoxanthum odoratum*, is one of the most abundant and useful of the family, contributing largely both to the fragrance and nourishing properties of good hay. It flowers as early as April and produces ripe seeds in June. It forms what may be called a quite common-looking panicle of a pale dingy-green colour, from every flower of which two stamens protrude in a very characteristic manner. The Fox-tail grasses have close dense spikes, which may be likened to tails, though not of foxes. The commonest of them is the Meadow Fox-tail, *Alopecurus pratensis*, which may be found in almost every good pasture. The Canary grass, *Phalaris canariensis*, may often be found on rubbish heaps, whither it has been conveyed in the emptyings of a bird cage. The panicle is large and almost globose, of a pale straw colour. The Reed Canary grass, *P. arundinacea*, produces a loose spike and the plant is extremely robust, growing usually by the sides of rivers. The common variegated grass of our gardens, the "gardener's garters" or "ribbon grass," is a variety of this native water grass, and its flowers therefore may serve to aid in the identification of the species when met with. The Mat weed or Sea Reed, *Amphipha arundinacea*, may be seen on the sea coast in great masses binding drifting sands, and thus preventing the dreadful injury they might inflict upon the inland countries when blown by storms towards the land. Its companions in this beneficent work are the Lyme grass, *Elymus arenarius*, a bold habited grass

with broad, arching, glaucous leaves ; and the Sea-sedge, *Carex arenaria*. The Cat's-tail grass, *Phleum pra-*



HARE'S-FOOT GRASS.
Complete plant, reduced.

HARE'S-FOOT GRASS.
Flower spike, natural size.

tense, may be found in almost every meadow, and is one of the most valuable hay grasses, though coarse and little cared for by cattle when growing. It pro-

duces a long close spike, which sufficiently agrees with its name to aid in its identification. The Hare's-foot grass, *Lagurus ovatus*, is quite a beauty, and I present you with a miniature of the complete plant as well as a figure of a flower spike natural size. It is scarce, being usually only found as a British plant on sandy spots in Guernsey, but it is much grown in gardens, both to adorn the rockery while living and to assist in the formation of winter boquets when dried.

The Millet grass, *Milium effusum*, is very distinct. If you can imagine a ghostly bit of wire work intended



FINE BENT GRASS.



SPREADING SILKY BENT GRASS.

to represent a succession of umbrella ribs with one stem piercing the whole, you may, when you meet with it, be able to effect an identification. Wretched comparison—suffice that this is a daddy longleg sort of a grass that I must not say another word about. The

Feather grass, *Stipa pennata*, you are not likely to find wild, but as you cannot do without its handsome feathery plume for winter bouquets, plant it in the garden and thus enlarge your field. The Fine Bent grass or Black Quintale (or Twitch), *Agrostis vulgaris*, bears most delicate, purplish spikelets on hair-like stems that tremble to every passing breeze.

Another pretty thing is the Silky Bent, *A. spicaventi*, with loose light panicle of pink or pale green hue, shining like silk, and bending most elegantly to the passing breeze. It is plentiful in moist fat lands near



TUFTED-HAIR GRASS.



REED MEADOW GRASS.

London. The Tufted Hair-grass, *Aira caespitosa*, is another delicate beauty, commonly inhabiting ditches and other like damp spots, and very plentiful near London. The flower spikes may be likened to wire-work dotted with beads to form a loose pyramidal

pattern. The Purple Molinia, *Molinia cærulea*, merits notice as the darkest coloured of all our grasses, the colour of the glumes being dark green with reddened tinge of blue, and the large anthers are of a purple colour. In form it is poor, the spikelets being on a long straight, wire-like stem, few and distant. The Soft Meadow grass, *Holcus lanatus*, may be found wherever a grass of any kind can live; and you may know it by its large and beautiful soft panicle of numerous small spikelets of a pinkish-purple colour, and its downy leaves. The flowering of this grass is in many districts the signal to begin hay-making.

The Reed Meadow grass, *Poa aquatica*, grows on the margin of almost every river in the land, and you must make acquaintance with it or, as a botanist, be accounted "nowhere" in the grasses. It bears a noble plume above its broad bright green leaves, and makes a bonny show in the shallows when in flower. As for the other poas, fifteen in number, we had best slide past all save one, and that one the Rough Meadow grass, *Poa trivialis*, is one of the very best for garden lawns in the vicinity of towns, and therefore well worth knowing. It is of slender make, with roughish stem, the panicle green, much branched, the stems of the spikelets long and wiry, the leaves taper pointed.

There are three species (so-called) of Quaking grass, and they are, perhaps, the loveliest of all the grasses that find their way into the garden. The Great Quaking grass, *Briza maxima*, is nothing other than a robust form of the Common Quaking grass, *Briza media*, and this being the queen of British grasses, we

present a portrait of her face life-size. The Cocksfoot Grass, *Dactylis glomerata*, you will soon learn to distinguish as a wild plant by observation of the low,



PANICLE OF COMMON QUAKING GRASS (NATURAL SIZE).

tufted, broad-leaved, variegated grass of the same name grown in gardens.

The Crested Dogtail, *Cynosurus cristatus*, is peculiarly distinct, with rigid, hard-looking spike of a lilac

hue. It grows everywhere, and is everywhere welcome for the valuable herbage it affords.

Sheep's Fescue, *Festuca ovina*, is a peculiarly fine-leaved grass growing in tufts on sandy soils, where it constitutes a most elegant rich green herbage. The panicles are unattractive. It varies much in character in different localities, and a blue-leaved variety is grown in gardens. In Greenwich Park three or four varieties may be found, one of them having leaves as fine as hairs. On heath lands a viviparous form of this grass



COMMON QUAKING GRASS.

may often be met with. This variety does not produce flowers. Everywhere, by the sides of dusty roads, and on old brick walls and chimney-stacks, a rather ugly, short, sturdy, barley-like grass will be found, but scarcely ever does the vagrant trespass on the meadows. It is the Wall Barley, or Way Bennet, *Hordeum muri-*

num. This is the grass that children put up their sleeves to vary the monotony of school-work.



SHEEP'S FESCUE, VIVIPAROUS FORM.

Finally, to dispose of the grasses, mention must be


made of the Darnel, *Lolium temulentum*, which is by no means common, though plentiful in some localities. The leaves are flat and rough on the upper side. The stem rises two or three feet high, bearing two rows of small spikelets, each containing about six flowers bearing hair-like awns. The plant attains a great size, and when growing amongst corn may be readily distinguished from other grasses. It has quite a literary fame as the "only poisonous grass," but in truth it is no more poisonous than a mushroom, which most of us are prepared to eat at any time without the shadow of a fear.

The garden is capable of affording immense aid in the study of the grasses, and the collections which are grown as ornamental plants comprise a number of British species which, as a rule, are scarce as wild plants. They are valuable, too, for winter bouquets, and far more pretty in their natural colours than dyed, as we see them in the shops. As for variety, it is truly wonderful that so simple a type should be capable of the variations which we find in this great family. What a contrast, for example, does the little quaking grass afford to the great silvery plumes of the American Pampas grass, *Gynerium argenteum*, which adorns our gardens with its fountain-like herbage and gleaming silvery feathers.



CHAPTER VIII.

THE FLOWERS OF JULY.

 HE shifting of the colours from the woodlands and hedgerows to the watersides and hill tops, which we noticed as characteristic of June, is equally noticeable now, and will become more and more so as the month advances. The fewer the flowers in the copse and the meadow, the more numerous they are on the mountain sides, amongst rocks and ruins, by the countless clear streams, and upon the water itself in still bays of rivers and lakes. The woods are as silent as they are flowerless, but we shall see and hear many birds on the moorland and by the margin of the sea, where if they only pipe and chatter we shall be content to hear them, and accept any small note as an apology for a song. The heavy umbrage of the woodland districts consorts well with the general silence, and increases the force of the invitation nature now seems to make to man to be quiet, to be at peace, to forego many a care in order to enjoy rest, to be content with life as it is, and to banish every remembrance of trouble as the remembrance simply of a foolish dream. If we sing at all, it should be in some

such strain as that of Longfellow's 'Day of Sunshine.'

"O gift of God ! O perfect day !
 Whereon shall no man work, but play ;
 Whereon it is enough for me
 Not to be doing, but to be.
 * * * * *
 O life and love ! O happy throng
 Of thoughts, whose only speech is song !
 O heart of man ! canst thou not be
 Blithe as the air is, and as free ?"

The restless spirit cannot long endure this sedative influence, but, with all the enticements to idleness that prevail, will at last find work to do, and, mayhap, the best and busiest work amongst the very things that conspired to produce the sweet melancholy and the soothed content. If the restless spirit has any care for wild flowers, there are as yet plenty of them, but their days are almost numbered.

Amongst a multitude of possible occupations we may very well give preference to hunting of hedgerows, rocks, heaths, and river sides for wild flowers ; keeping away from the meadows and corn lands as much as possible, as for the present, and from our present point of view, barren ground. As usual it matters not in what direction we bend our steps, the waysides will compel our attention by their variety of vegetation, and we shall not have proceeded far in observing ere we become pretty well convinced that certain plants belong to the wayside especially, and scarcely seek a home anywhere else, as if they loved the flying dust and the sounds of human footsteps and voices, and the

many other passing indications of the higher life of this great busy world, which make the common ways of life attractive. Commonest of all the common weeds is the Great Wayside Plantain, *Plantago major*,



GREAT WAYSIDE PLANTAIN.

a most interesting plant, though so destitute of beauty. It has followed every European colonist, and made itself a home in almost every part of the world. Its seeds may be conveyed in baggage and mixed up in the many sorts of merchandise, but as a rule, no doubt

it finds its way abroad mixed in the grain and grass seeds, and being in no ways particular about soil or climate, can soon make any strange land its home. Amongst the North American Indians it is called the "White-man's Foot."

The humble plantains of our roadsides and pastures are in no way related to the plantain or banana of the tropics, but constitute a quite distinct order of plants under the collective designation *Plantaginaceæ*, the



FLOWER OF GREAT PLANTAIN.

a a, Elongated filaments of stamens.

ribworts and waybreads. They are indeed waybreads to the finders, and their leaves afford a meal to cattle that is not quite despicable, though the poor donkey in search of a thistle is most likely to enjoy it. The flower scape is a pretty though humble object, and the little white or pale pink flowers may be easily dissected with the aid of a pocket lens. The calyx and corolla each consist of four parts, the stamens are borne on peculiarly long filaments, and are the most conspicuous

feature of the scape while the flowers are expanding in succession. A narrow-leaved kind, more distinctly ribbed, called Ribwort Plantain, *P. lanceolata*, is often met with on upland pastures, and is commonly sown mixed with grasses on lands intended for sheep pasture. The Hoary Plantain, *P. media*, produces a pretty scape of fragrant flowers, and which has a hoary appearance owing to the whiteness of the flowers.

We shall not go far upon the sunny highway without seeing plenty of thistles, unless, indeed, we are in a quite mountainous region, where, as a rule, thistles are scarce. One of the commonest wayside plants of this family is the Welled Thistle, *Carduus acanthoides*, a branched plant, with many smallish neat heads of pink flowers, and spiny leaves that fringe the stem like wings. The Spear Plume Thistle, *Cnicus lanceolatus*, is equally common, and a larger plant than the last. On clay lands it is the prevailing thistle, and a great plague sometimes in cultivated fields. The flowers are large, and of a light purple colour. The handsomest of them is the Milk or Virgin Mary's Thistle, *Carduus marianus*, a favourite in many a garden. It rises three or four feet high, the deep green leaves boldly veined with clear white; the flowers a fine purple colour. It has furnished many a good salad, and many a wholesome dish of cooked vegetable to the family table, and if chopped up or bruised forms a good fodder for cattle. The Musk Thistle, *C. nutans*, has formidable spines, and large reddish-purple flowers, which in the evening emit a delicious musky odour. The tallest of the family is the Marsh Plume Thistle,

Cnicus palustris, which loves rich moist land, where it will sometimes rise to a height of ten feet. On poorer soils it will generally rise four feet before it flowers. It has pinnatifid leaves, and clustered heads of flowers of a purplish-lilac or white colour.

A common field border species is the Creeping Plume Thistle, *Cnicus arvensis*, a variable, always handsome plant, of most robust habit, rarely rising higher than two feet, but spreading fast and far, and very often taking complete possession of cultivated lands of a good loamy texture, and driving out other forms of vegetation, so as tolerably well to earn for itself its startling name of "cursed thistle," by which it is generally known. It has pretty broadish heads of purple flowers. The Woolly-headed Plume Thistle, *Cnicus eriophorus*, may be known by its downy leaves, woolly involucres, and large pale pink and lilac flowers. If you want a thistle you can handle without pain to your fingers, hunt for the Various-leaved Thistle, *C. heterophyllus*, which has a cottony stem, soft, undivided leaves, which are downy beneath, and handsome heads of flowers of a fine purple colour. It is more of a mountain than a roadside plant. All the true thistles have their flowers tinted more or less with purple; so when you meet with a yellow thistle you may fairly guess it to be the Carline Thistle, *Carlina vulgaris*. Yet even this has purple florets, but they are accompanied by yellow chaffy rays which give the flower its peculiar character. We must quit the thistles by adding that the Scotch Thistle is *Onopordum acanthium*, a gigantic plant, with leaves that somewhat resemble those of the acanthus, but are

more silvery in tone, and flattish heads of dull purple flowers. This, too, is a wayside thistle, for it usually selects some stony waste for its residence, though it does not disdain the rich soil of the moist valley, and is everywhere a favourite in the garden.

The thistles are members of the great family of composite or compound flowers, *compositæ*, of which we may regard the common marigold or the daisy as a fair type. In all these what we call a flower is really a capitulum, or a head consisting of many flowers enclosed within a calyx-like involucre. In some of the sub-orders of the *compositæ* the florets forming the capitulum are all perfect; in others the outer florets are destitute of stamens and pistils.

A real wayside flower, though growing also in pastures, and a good example of a composite, is the Yellow Goat's Beard, *Tragopogon pratensis*, which is often a puzzle to the young botanist on account of its resemblance both to the dandelion and some large hawkweed. The flower closes at noon, and hence it is called noonday flower. The flowers are followed by large balls of downy seeds of a brownish colour, from which it takes its name of goat's beard. The Salsafy, *T. porrifolius*, is a near relation, with purple flowers and very beautiful heads of seeds.

We must pass a host of hawk bits, and cat's ears, and less attractive plants, to look for the Wild Lettuce, *Lactuca virosa*, which grows on walls and field borders. It is a most rustic plant with prickly stems and spreading oblong leaves, far above which rise the loose clusters of tiny yellow flowers, and as mean every way as any flowers of the season. Equally common is the

Wall Lettuce, *L. muralis*, with large lyre-shaped leaves, and flowers, that have five regular florets each, and to a beginner appear to have no relation to the composite order. The Sow Thistle, *Sonchus oleraceus*, needs only to be mentioned as almost a lettuce, and capable of being made nearly as good a table vegetable. Not far removed from it in affinities and properties is that splendid herb the Succory, *Cichorium intybus*, which may often be found on the gravelly railway bank and skirting the cornfield, presenting a glorious display of pale blue stars. The Burdock, *Arctium lappa*, was a favourite at the time when, perhaps, you gathered sow thistles for a pet rabbit and had an inkling for mischief of a cheap and simple sort. Its rugged and almost daring outlines have made it a stock plant with landscape painters, who lose no reasonable chance of planting it in their foregrounds.

There is yet a host of compound flowers to be found on waste places and road sides, of which we must mention but very few more, the discoid Knapweed or Hard-head, *Centaurea nigra*, is a very distinct plant, with the lower leaves lyre-shaped and heads of thistle-like flowers of a dull purple colour, the scales of the involucre almost black, the stem is as tough as wire, and the flower heads as hard as flints. The Corn Blue-bottle, *C. cyanus*, is a fine showy centaurea, stem and under sides of the leaves covered with down; the flowers brilliant amethyst and extremely characteristic in outlines. Last but not least in this great gathering of wayside composites occurs the Great Ox-Eye, *Chrysanthemum leucanthemum*, a plant often grown in the garden,



Lungwort.

Tufted Centaury.

as the moon daisy and the maudlin daisy. If you do not happen to know it, keep a look out for a large daisy-like flower with a circle of broad bold white rays enclosing a bright yellow disk.

It will be a poor country that does not show us somewhere on the roadside a sheet of wild roses, and if we could shut our eyes to all other floral attractions we might find enough in a rose of any kind to occupy our thoughts for one whole day, and suggest inquiries for

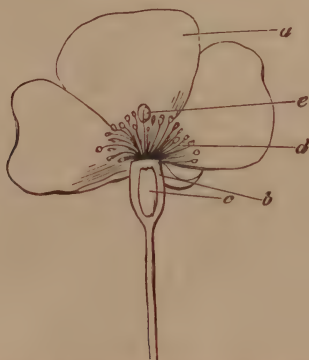


FLOWER OF DOG-ROSE.

a, Petals; *b*, stamens; *c*, pistils.

many times thereafter. The rose represents the great family of Rosaceæ in which are arranged, because in a certain sense they are roses, nearly all our best fruits, the peach, plum, cherry, strawberry, raspberry, apple, pear, quince, and blackberry; besides these, the hawthorn, which we do not consider a fruit, though the blackbirds and thrushes are of another opinion, is in the same sense a rose, and the potentilla, the spiræa, and the avens belong to the same glorious family.

All roses have a calyx of four or five sepals, or twice as many, and a corolla of five petals, uniform in size, inserted on the calyx. The fruit is a berry, or a pome, or a drupe. The order comprises trees, shrubs, and herbs in vast numbers, the majority being natives of temperate climates. They are as various in their properties as in their habits, the leaves of some producing hydrocyanic acid in abundance, while their



SECTION OF FLOWER OF TRAILING DOG-ROSE.

a, Petals; *b*, calyx, adhering to or forming the ovary or seed-vessel, *c*; *d*, stamens; *e*, pistils.

fruits are harmless and in many instances salubrious. The closest resemblances, as respects certain features, prevail amongst far removed members of this order, as for example, between the rose itself and the strawberry. How like a white rose of more than usually regular shape and firm texture is the flower of the strawberry. But turn them both round and you will see that the rose has only five sepals, while the strawberry has ten.

Having got so far, look for the wild Wood Strawberry, *Fragaria vesca*, and you will find that its paltry flowers are exact miniatures of the strawberry flowers of the gardens. Now to what order, let me ask, does the Common Bramble, *Rubus fruticosus*, belong? The flowers are at hand already, and very soon the hedges



BACK VIEW OF FLOWER OF TRAILING DOG-ROSE.

a, Petals ; *b*, urn-shaped tube of calyx, forming the seed-cup ;
c, upper divisions of calyx ; *d*, peduncle.

will be covered with them ; surely this too is a rose, and the wild counter part of the raspberry of the garden.

Equally characteristic are the leaves of these plants. In the apple, pear, cherry, plum, peach, hawthorn and quince, the leaves are undivided ; but in the brambles, strawberries, potentillas, burnets, and spiræas, they are divided on a plan which in every case resembles more

or less that of the rose itself—a great help this to the young botanist.

Now let us hastily name a few rosaceous plants that are worth finding. The meadow sweet, *Spiræa ulmaria*, you may look for in ditches and in the moist ground near a stream, where its foam-like flowers are as noticeable for their powerful almond-like odour as



BACK VIEW OF STRAWBERRY FLOWER.

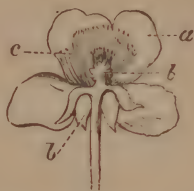
a, Petals of corolla ; *b*, sepals of calyx ; *c*, peduncle ; *d*, bract.

for their lace-like beauty. The willow-leaved spiræa, *S. salicifolia*, has willow-like leaves and light clusters of rose-tinted flowers ; the Common Avens, *Geum urbanum*, loves the moist, rich soil by the field side, where the sun shines brightly. It has smallish deep yellow flowers not unlike those of the cinquefoil, which often

keeps it company. Very distinct is the water Avens, *G. rivalis*, which indeed is not a wayside flower, but must be sought on marshy ground. The flower is like a large seal with dull purple calyx and deep yellow corolla. The white Mountain Avens, *Dryas octopetala*,



COMPOUND LEAF OF ROSE.



SECTION OF BLOSSOM OF
COMMON BRAMBLE.

is a glorious alpine plant with eight snow-white petals, and compact tufts of yellow stamens. It has been rarely found on the higher land of Cumberland and Yorkshire. The Potentillas and Tormentillas will not occasion any great amount of trouble, and you may soon, by the aid of a trustworthy Flora, make acquaintance with all the British species: the Common Tort

mentil, *P. tormentilla*, is one of the loveliest gems you will ever meet with on a summer's day ; its rich green, glossy, five times divided leaves, and its exceedingly neat small yellow flowers, and its compact miniature habit,



COMMON BRAMBLE FLOWERS, ARRANGED IN A CORYMB.

a, Petals ; *b*, calyx sepals ; *c*, stamens ; *d*, pistils ; *e*, pedicels ;
f, bracts ; *g*, setæ or bristles ; *h*, compound leaf.

are characters that combine to make it represent the smile of the season for those who can feel as well as see a smile, and to whom it is no hard task to believe that

nature not only smiles, but heartily laughs at us this time. The Common Agrimony, *Agrimonia eupatoria*, a genuine wayside flower, is also a member of the rose family; you may find it in almost any woodside hedge, presenting a tall slender spike on which the small yellow flowers are placed far apart.

As for the roses themselves we have about twenty native species, and therefore much might be said on the heads of the family to balance what has been already said of the tails. But we must be content with noticing a few of them very briefly. The Common Dog Rose, *Rosa canina*, needs to be named merely, for everybody knows it for its beauty and sweetness, though it is but faintly scented. It is the "canker" of the old poets, and is still known by that name in the west of England. The Sweet Brier, *R. rubiginosa*, grows wild in the south of England, adorning and perfuming many a bosky dell. This is the "eglantine" of the poets, the "eglantere" of Chaucer. The Burnet-leaved Rose, *R. spinosissima*, is by no means well known. It forms a dense bush, with dark wiry stems terrifically armed with spines. The leaves are small with roundish segments, and the flowers small, and generally cream-coloured, but sometimes snowy white, sometimes delicate rosy blush. It is highly fragrant and extremely beautiful. We must search in sandy and chalky places for the burnet-leaved rose, for it rarely grows on cultivated ground. Equally distinct in character is the Trailing Rose, *R. arvensis*, which never forms an independent bush, but flings its long whip-like shoots over the hedge and amongst the purple

stems of the dogwood on the common. It has large blush-coloured or pure white flowers; the Ayrshire roses of the garden are varieties of this wilding.

Hackneyed quotations in praise of the rose may be found in plenty in the books. Here is a bit of poetic jewelry that has not been hackneyed :

“Sweet rose, fair flower, untimely pluck’d, soon vaded,
 Pluck’d in the bud and vaded in the spring!
 Bright orient pearl, alack! too timely shaded!
 Fair creature, kill’d too soon by death’s sharp sting!
 Like a green plum that hangs upon a tree
 And falls, through wind, before the fall should be.”
 SHAKESPEARE’S *Passionate Pilgrim*, VIII.

Once more on the road, and exploring the hedge-rows. Surely a discovery this time—a yellow dead nettle. “Dear me, I did not know there was such a thing!” exclaims somebody. My dear somebody, there are many other things in the world that you do not know of, and some (perhaps only a few) that you will never know or hear of. There are, indeed, several yellow dead nettles; here is one called the Weasel-snout, *Galeobdolon luteum*, a stout herb, growing two feet high, closely resembling the white dead nettle, *Lamium album*, which grows on the sunny bank alone, but the galeobdolon has handsome deep yellow flowers, and loves the shade. The Downy Hemp Nettle, *Galeopsis ochroleuca*, is a very scarce downy-leaved plant with large pale yellow flowers. The large-flowered Hemp-nettle, *G. versicolor*, is a strong-growing rustic herb with large flowers of a fine pale yellow colour, tipped with dull purple. The characters of the

labiates are easily impressed upon the mind, yet it often happens that beginners confound the hood of a delphinium or aconite for the upper segments of the labiate flower.

Let us compare the dull purple flowers of the Self-heal, *Prunella vulgaris*, one of the commonest of the wayside plants, conspicuous always by the dark dull hue of its leaves, with those of the Monkshood, *Aconitum napellus*, which grows wild in a few moist woody localities, and may be found in almost every garden. The self-heal has an irre-



FLORET OF LABIATE PLANT.

a, Stamens contained within upper or hood-like division of the corolla;
b, lower lip of corolla; *c*, calyx, which is slightly irregular.

gular flower enclosed in a tubular calyx; it is two-lipped, the lower lip the largest divided into three distinct lobes. All the plants of this order have these labiate flowers; they also have opposite leaves, square stems, and not one of them possesses poisonous properties. In the Monkshood there are five purple sepals, which constitute the principal part of the flower, and indeed play the part of petals. One of these is helmet-shaped, forming the hood from which the flower takes its name.

The labiate family includes a number of aromatic and bitter plants, such as mint, sage, marjoram, and other proper inhabitants of the herb garden. We



COMMON SELF-HEAL.

shall find upon the heath, forming round moss-like hillocks for the rabbits to gambol amongst, the lovely wilding thyme, *Thymus serpyllum*. The Spearmint of the

garden, *Mentha viridis*, may be occasionally found wild in marshy places, but far more common and more beautiful is the Water Capitate mint, *M. aquatica*, which throws up from the shallow water handsome round heads of pale blue or pale lilac flowers. The Wood-sage, *Teucrium*



COMMON MONKSHOOD.

scorodonia, begins to bloom now in the woods and on dry heaths near the sea, forming large clumps of weedy vegetation covered with spikes of rather insignificant flowers of a yellowish-green colour tipped with purple.

The Wood Betony, *Betonica officinalis*, is too important a plant to pass by, especially as at first it may be mistaken for a dead nettle of a superior kind. It will be observed, however, that the intervals between the whorls of reddish-purple flowers are not uniform; in some instances several whorls are crowded together and between those and the next the stem is blank and then more whorls occur. This is what botanists call "interrupted." In the dead nettles the intervals between the whorls are regular, and the whole spike symmetrical in the arrangement of its parts. With the betony we shall be pretty sure to find the hedge Woundwort, *Stachys sylvatica*, a showy hairy weed with thin textured heart-shaped leaves, all on footstalks, and whorls of pretty flowers of a reddish-purple spotted with white.

As we began the labiates of this month with a caution against a possible error, we will now part from them with another caution, which may be put into an aphoristic form to the effect that dead nettles are not live nettles! In other words, a dead nettle is not a stinging nettle, nor related to it even remotely. Our Common Great Nettle, *Urtica dioica*, represents the natural order, *Urticeæ*, which in the older classifications comprised the elm, fig, mulberry, bread fruit, and deadly upas. As now restricted, the order comprehends a number of apparently unrelated plants. They agree, however, in being monœcious, that is, in producing on the same plant flowers of two sexes destitute of corollas, and therefore usually unattractive. The common nettle resembles a labiate in only two features—the leaves are undivided and the stem is

obscurely four angled. But the flowers have no corollas, the sexes are separated, and the leaves are armed with poisonous bristles, with which no doubt you are sufficiently familiar. A near relation of the nettle



COMMON STINGING NETTLE.

is the Pellitory, *Parietaria officinalis*, which you will be sure to find amongst long neglected rubbish, and on old walls, and amongst ruins, where it forms thick beards of dull green weedy vegetation amidst which the

minute dull red flowers peep out like a powdering of brick dust. The elm produced its dark clusters of flowers in March, but the hop, *Humulus lupulus*, a near



FERTILE FLOWERS OF THE COMMON HOP.

relative of the nettle, is now in flower, and should be sought with all haste, for comparatively few people are aware that it produces flowers, though indeed they are

in their way pretty, and as unlike "hops" as can be imagined. The male flowers are in green panicles of a light graceful appearance, each flower consisting of five segments which we may call sepals, and five stamens. The female flowers are in cones or catkins, each scale of which bears a female flower at the base, every flower having two stigmas. These cones become in due time the "hops" of commerce, and scarcely one person in a thousand who has admired them when living, and rejoiced over them when dead, for the bitter flavour they impart to beer, could tell us whether to regard the hop as a flower, or a fruit, or what else.

Heaths and rocks and barren mountain slopes are grand places for the botanist in July. The great hills that were black as ink up to the very dawn of summer are now sheeted with crimson and gold; every damp hollow is clothed with ferns, and where the mountain spring trickles over the mossy ground on its way from the rugged cairn, out of which it issues to the bog below, its course is marked by the curious red leaves and delicate white flowers of the Sun-Dew, *Drosera rotundifolia*, which sparkles all over with the exuberant moisture it has sucked out of its peaty bed, and is now distilling through its leaves in the sunshine.

This gem shall be the signal to us that we have found the happy hunting grounds. It may be that, as we spring forward into the midst of the heather, chanting some snatch of a song, we suddenly find ourselves in the midst of a tangle of red threads woven all over the mountain side, so that what we regarded from a distance as heather simply, consists of heather heightened in



ROUND-LEAVED SUN-DEW.

effect by this under carpeting of textile stuff. This is nothing else than the far-famed Lesser Dodder, *Cuscuta epithymum*, a terrific plant in its way, for it is a parasite

born to strangle whatever it embraces. The Londoner who would make sure of seeing this plant in a short trip had best go to Leatherhead by rail, and then walk to Oakshott Heath, where there are some splendid



LICHEN, LING, AND DODDER.

breadths of it mixed with the Common Ling, *Calluna vulgaris*, on a groundwork of white lichen. Having once seen Oakshott it may prove to be a place of frequent resort, for it is one of the richest, if not *the*

richest, in botanical spoils of any spot equally near the metropolis. Whoever makes a journey after Dodder should somewhere on the road procure a bit of the Field Bind-weed, *Convolvulus arvensis*, as an exponent of the characters of the Dodder, the pretty parasite being a miniature *Convolvulus*. This bind-weed rambles over hillocks on the road side, and runs up amongst



FIELD BINDWEED.

the tangled stems of bramble on the hedge bank, and plays at "bo-peep" amongst the corn, and very much to the injury of the corn too. The corolla of a convolvulus consists of only one piece, though marked as if formed of a number of petals united at their edges.

We shall be sure to find upon the heath lands or upon the heath-like wastes that occur in the midst of fruitful districts a number of pretty plants of the Fig-wort

family, *Scrophularineæ*. These all have irregular corollas, as in the foxglove and snapdragon. The speedwells are fig-worts of the simplest form, with wheel-shaped corollas. Usually these plants have tubular flowers, the mouths of which gape as in the labiates. One of the prettiest is the Red Bartsia, *Bartsia odontites* (Plate 6), which is almost invariably accompanied by the delicate Eyebright, *Euphrasia officinalis* (Plate 6), a plant of great renown amongst the herbalists of old. The perky spikes of yellow flowers in the field paths and on the weedy banks are those of the Yellow Toad Flax, *Linaria vulgaris*, a member of a large family, the prettiest of which is the Ivy-leaved Toad Flax, *L. cymbalaria*, a creeping plant that loves to clothe the brick or stone wall of the old bridge with its elegant dark green roundish leaves, and extremely elegant small lilac-coloured flowers. The Great Mullein, *Verbascum thapsus*, will make itself known by the tall spire-like spike of yellow flowers, which rise out of tufts of large woolly leaves. Though coarse it is grand; and though "a weed," we can scarcely pluck up courage to root it out of the garden, where it has a habit of planting itself in the flower beds. The Moth Mullein, *V. blattaria*, is a beautiful species, and rather scarce. It has shining leaves and rich yellow flowers.

We may expect to find somewhere on the heathy waste that favourite of the fairies, the Harebell, or Harvest Bell, *Campanula rotundifolia*, the name of which ought to fill a young botanist with perplexity. It is the *Round-leaved* Bell-flower, yet we see plainly that it has linear leaves. But let us make sure by taking the

plant up by the roots. Now we see the reason of its name, for the leaves next the root are roundish heart-shaped, but as they are generally hidden by the grass,



ROUND-LEAVED BELL-FLOWER.

a a, Linear leaves; *b b*, bracts.

amidst which the plant grows, few people who notice wild flowers are aware of their existence. When carefully grown in the garden this becomes an extremely elegant plant. A few years ago a white-



CAMPANULA ROTUNDIFOLIA.

flowered variety of it was exhibited as a “specimen” at one of the great exhibitions of the Royal Botanic Society by Mr. Chitty, a veteran London florist. The exhibitor was rewarded with a certificate of merit. The

figure on page 125 represents the plant as it appeared in the exhibition tent. The Rampion, *Campanula rapunculus*, you will find in the herb garden, and in the flower garden a host of the handsomest campanulas. Let us



COMMON YELLOW LOOSESTRIFE.

a a, Flowers springing from the axles of the flower-leaves or bracts.

look out, however, upon the heath, and more especially in the boggy hollows, for the Ivy-leaved Bell-flower, *C. hederaceæ* (Plate 8); it is the very counterpart, in its way, of the ivy-leaved toad flax.

Having got into the bog, we must be in no hurry to get out again. I beg pardon for not enumerating, amongst the implements necessary for a botanist, a pair of water boots. Bogs are full of wonders for those who have eyes, but are all inviting to such as have not learned to observe. Where the little bell-flower grows we may hunt for the Bog Pimpernel, *Anagallis tenella* (Plate 6), and its near relative the Money-wort, or Creeping Loosestrife, *Lysimachia nummularia*, and the Great Yellow Loosestrife, *L. vulgaris*. These last three are members of the primrose family.

Not far off, perhaps, on sunny banks and dry rocks, especially if we are near the sea, we may find the Sea Milkwort, *Glaux maritima* (Plate 1), a charming little tufted plant with small pink flowers. But before we quit the bog we must find the Bog Asphodel, *Narthecium ossifragum*, which we cannot mistake, for there is no other rush-like plant with yellow flowers for which it might be mistaken.

But here we are amongst the rushes, for the bog asphodel is a true rush, although it has coloured flowers. The majority of the rushes have cylindrical leaves and unattractive flowers, but the common Flowering Rush, *Butomus umbellatus*, is one of the noblest of our native aquatics, producing splendid large pink flowers on tall flower stems that rise high and proudly above the rank vegetation of the river side. The heath lands usually produce a number of rushes. One of the most common is the Great Hairy Wood-rush, *Luzula sylvatica*, which closely resembles a grass. The Soft-Rush, *Juncus effusus*, is common everywhere on marshy lands; the



HAIRY WOOD-RUSH.

stems leafless and pliant, the flowers in a spreading panicle. It is from this rush that wicks are obtained for candles. The Wayside Rush, *Juncus conglomeratus*,

is also pliant and adapted for making candles, but is less useful than the last. Before we quit the wild scenes we ought to find the Cotton Grass, *Eriophorum angustifolium*, which grows in almost every bog. It may be known by its roundish tufts of white silky flower heads, which are as like balls of cotton as anything we might expect to find in the wilderness. This plant is not a rush, but a sedge.

Somewhere on high rocks and burning sandy ridges the Rock-roses are now flowering; but as they are scarce wildings it may be better to look for them in the garden. The Common Rock-rose, *Helianthemum vulgare*, is the most plentiful, being rather common in a few chalky and gravelly districts. Its tender tint of green in the spring has a most cheering effect, but now its leaves are dark and the stems are red, and the numerous yellow flowers glitter in the sun so brightly as to constitute a wonderful metamorphosis of the timid-looking plant we admired in the early months of the year. *H. guttatum* (Plate 4) is European rather than British; its only recorded British stations being in Ireland, which, though part of Great Britain, does not belong to Britain proper.

Two more pretty plants must be looked for while they are yet in flower. The Wild Mignonette, *Reseda lutea*, may be known by its close resemblance—save in odour, which is unpleasant—to the Garden Mignonette, *Reseda odorata*. It is a common weed on chalk, and on the “tips” in mining districts. Another favourite with young botanists is the Bed-straw, *Galium verum* (Plate 8), a pretty member of the madder tribe which grows

in plenty on dry banks everywhere, and in pastures near the sea.

We cannot close this chapter without a few words on a class of plants which on every hand present themselves to view, and which particularly abound in damp and sandy places. These are the umbelliferous plants, the wild parsleys, hemlocks, fennels, and sanicles. It

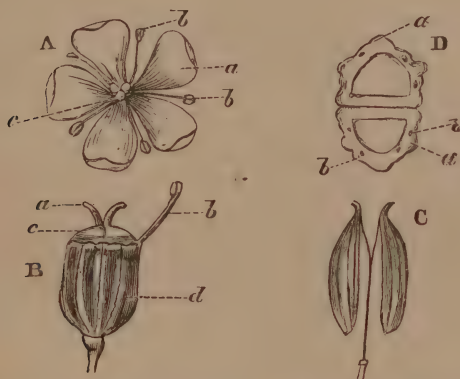


COMPOUND LEAF OF UMBELLIFEROUS PLANT.

a, Sheath for stem.

would need a larger book than this to present anything like a sufficient notice of them, for they are most difficult to deal with in detail, and few British botanists are acquainted with them *in extenso*. From this great family we obtain the carrot, parsnip, celery, caraway, coriander, and other useful plants, yet the order comprises a large number of poisonous plants, and therefore it is a good rule in botanising to know an umbellifer

the moment you see it, and to keep in mind that to taste leaf, flower, or root, is dangerous. One of the most striking characteristics of the plants of this order is the production of the flowers in umbels. The inventor of the umbrella must have obtained the hint from one of these plants. The leaves are usually much



A, Flower of Umbelliferous Plant: *a*, petal, with inflexed point; *b*, stamens; *c*, pistil, with double style. B, Fruit of Umbelliferous Plant: *a*, styles; *b*, stamen; *c*, a fleshy disk; *d*, double fruit. C, Ripe Seeds or Carpels separating from central axis: D, Section of Seeds: *a*, ribs; *b*, oil-channels, or *vittæ*.

divided, and in many instances are extremely elegant, as the fennels and parsleys will testify. The flowers rarely display individual beauty, although the large light umbels in which they are produced assort well with their elegant leaves. The calyx is in five segments; the petals are five in number, and sometimes unequal in size; there are five stamens. The fruit is a curious production, consisting of two carpels, which

adhere by their faces to a central stalk, from which when mature they separate below while remaining at-



FLOWERS OF COMMON BEAKED PARSLEY, ARRANGED IN COMPOUND UMBELS.

a, Central point of primary umbel; *b*, bracts, or involucler, at central point of umbel, or partial umbel.

tached at their upper extremity. Each carpel is marked by five vertical ridges, which, however, are sometimes inconspicuous; each carpel has a single seed. A con-


spicuous plant of this order is the Fool's Parsley, *Æthusa cynapium*, the flowers of which have an involucre of three long sharp-pointed leaflets hanging down under each partial umbel.

The Wood-Beaked Parsley, *Anthriscus sylvestris*, is so called because the egg-shaped fruits have short beaks. This plant is in fruit now and should be studied with care, for it is much sought after as food for rabbits, and its leaves are wholesome to man, though its roots are poisonous. It is one of the first of umbelliferous to deck the hedgerow in spring. The Common Beaked Parsley, *A. vulgaris*, has longer fruit than the last and is less wholesome, in fact it is poisonous, though not virulently so. The Common Hemlock, *Conium maculatum*, grows in waste places and amongst ruins. It is an elegant plant, with dark stem and dark foliage, most elegantly cut, and umbels of white flowers that render it a conspicuous object amongst the rubbish it is usually associated with. This is the plant that was employed by the Athenians as a state poison, and was the instrument of the execution of Theramenes, Phocian, and Socrates. Shakespeare represents Lear in his madness wearing a crown composed of noisome weeds.

“.....He was met even now
As mad as the vex'd sea: singing aloud;
Crown'd with rank fumiter, and furrow weeds,
With harlocks, hemlock, nettles, cuckoo-flowers,
Darnel, and all the idle weeds that grow
In our sustaining corn.”

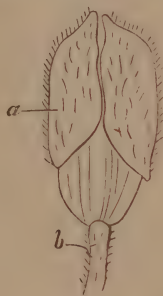
CHAPTER IX.

THE FLOWERS OF AUGUST.

HE diminution of flowers in the fields is a peculiar characteristic of this season, more especially because the greater part of the flowers that adorned the land erewhile have disappeared suddenly and completely, producing a sort of darkness as an eclipse of the sun would. But there are flowers in abundance yet. The water courses are astonishingly gay and the heath lands are glorious. The soft colour of the ripening corn may perhaps please us more than all else, not alone for its beauty, and it is beautiful, but for its suggestion of material plenty, and the social and spiritual blessings that accompany a sufficiency of the necessities of life. He knew the ways of men who made his prayer to be "Give me neither poverty nor riches," and better still knew Another who said, "Seek ye first the kingdom of God, and all these things shall be added unto you."

Even the corn fields have their flowers, and notorious amongst them is the Common Poppy, *Papaver rhœas*, which shines like a live coal on the gravelly bank, and impudently looks up amongst the browning heads of the wheat, as if to say "grandeur before usefulness."

You ought to know the poppy altogether, for it is an important plant. In relationship it comes very near to the buttercups, yet it is a representative of a distinct



Poppy-bud Drooping before Flowering. *a*, The two-pieced calyx.

Expanding Flower of Common Poppy, throwing off calyx, *a*.

order possessing strongly marked characters. When folded in the bud the poppy hangs its head, but when about to expand lifts it up and looks boldly at the sun-



Seed-vessel of Common Poppy, *a*; *b*, stamen;
c, part of petal.

shine. The calyx consists of two pieces which are "caducous," that is to say, they fall off as the flower

opens, instead of remaining, as in many other cases, to protect the flower or the seed. The petals are four in number, expanding boldly and for a brief while making a glorious show. There is but one pistil, but many stamens, and the seed capsule or ovary, which may be regarded as the base of the pistil, is divided into cells by partitions which radiate from the sides but do not meet in the centre. Of the narcotic properties of the poppy there can be no need to speak except to say that this common field poppy yields from its seeds an oil equal in every good quality to that derived from olives, and that opium of an inferior quality may be obtained in the usual way from its capsules. The Opium Poppy, *P. somniferum*, is occasionally met with as a wild plant. It is usually a large white flower with a deep purple spot at the base of every petal, but from this colouring it varies to a light lilac. When grown in fields for the purposes of the druggists it presents a marvellously beautiful appearance, as the wind plays about upon the sheets of light flowers and makes them imitate the ripples, and dimples, and splashes, of a silvery lake in wonder land. Opium is obtained by making incisions at sunset in the capsules, the result being an exudation of a gummy cream-like substance, which is scraped off next morning.

A common species, less beautiful than either of the foregoing, is the Rough-headed poppy, *Papaver argemone*; the flowers are smaller and less richly coloured than those of the scarlet poppy, and the capsule is club-shaped and bristly. The Scarlet Poppy has broad petals which overlap at the edges, but the Rough-headed poppy



Bog Pimpernel.



Common Eyebright.



Red Bartsia.



Smooth Sea-heath.

has narrow petals which stand apart like those of a cruciferous plant. The Yellow-horned Poppy, *Glaucium luteum*, may be identified at first sight by its glaucous leaves and the long horn-like pistil protruding from the centre of the large handsome yellow flower. This pistil in due time becomes a seed-pod about eight inches long, and would attract attention for its singularity if the plant had not a flower left upon it. This is a sea-side plant, and the gayest of any of the wildings that put their feet willingly in the brine. Somewhere amongst rubbish and ruins you may meet with the Great Celandine, *Chelidonium majus*, which has the caducous calyx of the poppy tribe and a pod-like capsule after the fashion of the glaucium. The flower is yellow, the plant leafy, and every part of it exudes a thick yellow juice which possesses valuable medicinal properties. Another lesson here of the folly of trusting to "English names," as they are called. We have two celandines; they are herbaceous plants, bearing yellow flowers; but one is a buttercup, the other is a poppy, one flowers in February and March, the other from April to October; one loves the marsh, the other the dry ruin; they scarcely agree in anything except name.

If we had to assign to every month some one flower as its peculiar characteristic, probably August would be most consistently mated with the common Mallow, *Malva sylvestris*, of the botanist. Everywhere now on field paths and sunny banks it makes its bright display of rustic flowers. Of course the mention of this roadside weed will remind the reader of another and better plant—the Marsh or Mash Mallow of the herbalist;

the *Althæa officinalis* of the botanist. This grows in salt marshes and in damp hollows in all parts of these islands, though it is by no means the frequent plant it is generally supposed. The truth is that the common mallow is gathered and sold for it, and hence few people know that the true marsh mallow may be distinguished by one unmistakeable peculiarity, the leaves being so downy that we cannot think of anything else in nature that may be likened to them except it be some of the softest furs and downs with which certain animals are provided.

No one needs to be reminded that this is one of the most valuable herbs in the village pharmacopœia. Who, indeed, has not witnessed the soothing effects of its emollient juices, healing within and without. The pollen, which so abounds in the flower, affords a pleasing subject for the microscope, each particle being spherical and toothed like the wheel of a watch. The mallow tribe is characterised by features easily recognised, and it would scarcely need the suggestion in words to enable the beginner who had studied a mallow flower to perceive that the *Hibiscus* of the greenhouse, and the *Althæa frutex* of the garden, are both true mallows. The sepals and petals are each five in number; the stamens numerous, and united by their filaments into a tube; the ovary formed of several carpels; the leaves always alternate. The kidney-shaped anthers are a conspicuous and universal feature of the plants of the order of mallow-worts, or *Malvaceæ*.

The Dwarf Mallow, *M. rotundifolia*, has prostrate stems, and small pale greyish lilac flowers. The Musk

Mallow, *M. moschata*, is the handsomest of the British mallows, having light rose-coloured flowers borne on stems two or three feet high, and light green foliage which emits in the evening a pleasant odour of musk. A showy seaside plant is the Tree Mallow, *Lavatera arborea*, which is frequently grown in gardens. The little Hispid Mallow, *Althæa hirsuta* (Plate 4), is a rare and beautiful plant, with solitary bright pink flowers borne on bristly stems amid rough leaves.



SPRAY OF COMMON SCARLET PIMPERNEL.
a a, Flowers springing from the axils of the leaves

When the corn is carried a host of flowers will appear amongst the stubble, and prettiest of them all will be the Scarlet Pimpernel, *Anagallis arvensis*, a member of the primrose tribe in botany, but a nestling of the heart in the world where sympathy takes the place of science,

its beauty transcending almost (!) that of the forget-me-not.

A companion of the pimpernel in the field will be the Mayweed, or Corn-Fever few, *Pyrethrum inodorum*, or *Chryanthemum inodorum*, with large white flowers which



COMMON WILD CHAMOMILE.

a, Disk; *b*, ray; *c*, peduncle.

are almost odourless. The Corn Marigold, *C. segetum*, may be looked for in the same field, its splendid golden flowers and glaucous foliage rendering it conspicuous

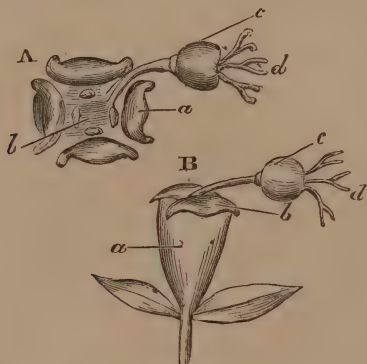
amongst the stubble or the standing corn. Surely, too, we shall find the common Chamomile, *Anthemis nobilis*, which we may recognise by the pleasant odour it emits when brushed by the hand, so very different to that other very common and almost too common Stinking Chamomile, *A. cotula*, which covers waste places with patches of fennel-like vegetation dotted with white flowers.



PETTY SPURGE. THE FLOWERS ARRANGED IN UMBELS.

The spurges are now full of fruit, and a few still in flower. They are as poisonous as they look, so beware of tasting the smallest particle of one; for if you are

not seriously hurt thereby, you will be sure to suffer. The commonest of them is the Petty Spurge, *Euphorbia peplus*, which grows in every waste place where the sun shines, presenting curious weird tufts of bright herbage surmounted with flowers that appear to be enclosed in collars or cups. The spurges are a large family possessed of very evident relationships, so that any one of them may be known as a spurge at first sight by a mere



MAGNIFIED FLOWERS OF PETTY SPURGE.

A, Front view : *a*, glands of involucre ; *b*, stamens ; *c*, ovary ; *d*, pistils ;

B, Side view : *a*, involucre ; *b*, glands ; *c*, ovary ; *d*, pistils.

beginner who has studied any of the species. The spurges produce two kinds of flowers,—those bearing stamens (males), and those bearing pistils (females). The pistils are usually three in number, and the ovary three-celled. Our peculiar-looking weeds only faintly represent the family, for it includes the noble castor-oil plant, the manchineel, the manioc, and the prickly Euphorbias that are grown in hothouses for their splendid scarlet flowers.

The Cypress Spurge, *E. cyparissias*, forms an elegant grass-like tuft of yellowish-green vegetation, covered in the early part of the summer with yellow flowers that are scarcely attractive. It is a favorite garden plant on account of its peculiar colour and elegant contour. The Caper Spurge, *E. lathyris*, is well known as a garden plant; it grows like a shrub, the colour dark sea green, with bold, heart-shaped bracts, and large capsules which are sometimes pickled and eaten as capers. Though poisonous when fresh, the pickling may render them innocuous. Nevertheless they are not to be regarded as wholesome, and it may be well to add that the true caper is the product of an altogether different plant, the caper tree, *Capparis spinosa*, a most elegant flowering plant which grows commonly on old buildings in the South of France and Italy. The Sun Spurge, *E. helioscopia*, is the commonest of the British Euphorbias, growing on waste lands in plenty, and to be found in almost every kitchen garden. It varies in height from two inches to two feet, and bears in July and August a comparatively large head of greenish-yellow flowers.

All the species of St. John's Wort are in bloom now; some of them, indeed, have been in flower since the beginning of June. One of the most noticeable, especially if it shines out upon the side of an old brick wall or stone fence, is the Common Tutsan, *Hypericum androsæmum*, a quite common species in Devon and Cornwall, but rare elsewhere. The hypericums may be distinguished as such speedily, but it is another matter to determine the several species. Some of them are

shrubby, others herbaceous; but there are strong family likenesses in their opposite, ovate, or elliptic leaves, and their showy yellow flowers in which the stamens project conspicuously in bundles. A common garden plant, though scarce as a wilding, is the Large-flowered St. John's wort, which forms a close-growing bushy tuft covered now with large handsome yellow flowers. A quite common kind is the Perforated St. John's wort, *H. perforatum*, which fringes the woodside and hedgerow with its fine orange-coloured flowers. In this species the leaves are strongly ribbed and full of dots, which must be looked for by holding them up to the light; the stem is distinctly two-edged. A curious and quite distinct species is the Marsh St. John's wort, *H. elodes*, which grows in plenty in the "Black Ponds" at Claremont. It has small hoary leaves and small pale yellow flowers. All the traditions and bits of folk-lore that make the St. John's wort a legend belong, doubtless, to *H. perforatum*, which we must regard especially as *the* St. John's wort, scaring from the midnight heath the witch and goblin with its spicy breath. The "midnight heath" has no particular charms for the botanist. The cool breeze may be delicately perfumed with the breathings of furze and heather bloom, and the "flowers of heaven, the golden stars," may lift the thoughts of the wanderer from earth to higher things; but we want the daylight to display the glories of the flowery waste, where the grasshopper lark fills the bracken and bramble with its sibilant whispering, and the piping of the curlew resounds upon the stony moors.

Nowhere can the botanist who has been accustomed

to town life and its peculiar moral surroundings find more delightful entertainment now than upon the heath lands, for not only are they extravagantly rich in colour wherever the furze and heather congregate, and on the higher ranges swept by bracing breezes, but everywhere may be seen forms of vegetation that never occur in the pastoral countries, or on fat lands, or—except very rarely—in the vicinity of towns. The Londoner may do well for a botanizing tour at Hampstead. Better far anywhere on the Bagshot range, especially where there are fir woods and bogs. The heathy districts of the New Forest are scarcely inferior in grandeur of scenery and variety of vegetation to the Highlands of Scotland. It is impossible to enjoy the wilder scenes of nature without a deep consciousness of the perfect harmony between the forms of vegetation they produce and the abrupt and sometimes fantastic outlines of the hills and rocks, and the sudden transitions that occur from leagues of black heath, or lichen-coated sand, to green oases where the grasses and crowfoots congregate, and the water pimpernel and the sundew form connecting links between the moist and the arid districts. Although we are surrounded with wonder at all times, and may even regard our own frames and faculties as miracles, it is only on rare occasions and in rare scenes that we can truly look on nature as the visible evidence of the invisible God, for use and wont do weaken all the first impressions that every phase of existence should secure. It may be that on the lovely heath where the hills rise on all sides and exclude all fruitful lands from view, we may experience spiritual sensations which no

ordinary scenes would arouse, and feel life itself to be a draught of joy for which we were all unprepared in the monotony of our every day being. The very consciousness that the world is more than we can master, and life an enigma which the Almighty alone can solve,—the consciousness of being wrapped around with mysteries does not occur to us as we walk in the old ruts and grooves of custom; but one hour upon a breezy heath may reveal to us more within ourselves than we ever knew of before, and, as it were, re-establish our union with nature as subservient to our higher relations with Him that filleth all in all. Let us hear the wise poet Spenser on some such thought as may flash upon us as we make our way in solitude full of inward peaceableness across the flowery heath:

“ Take thy ballaunce, if thou be so wise,
And weigh the wind that under heaven doth blow;
Or weigh the light that in the East doth rise,
Or weigh the thought that from man's mind doth flow:
But if the weight of these thou canst not show,
Weigh but one word which from thy lips doth fall:
For how canst thou those greater secrets know
That dost not know the least things of them all?
Ill can he rule the great that cannot reach the small.”

The heaths represent a race of plants which are better known for beauty than usefulness. They have bell-shaped flowers which consist of one petal each, generally four-cleft, and a four-cleft calyx; the fruit a berry or a dry capsule. The heaths of the Cape of Good Hope, the rhododendrons, azaleas, and kalmias are famous plants in gardens. The best known of our ericaceous plants is the Common Ling, *Calluna vulgaris*, which



Cross-leaved Heath.



Cornish Heath.



Cranberry.



Fine-leaved Heath.

grows in the greatest abundance on the heath and about the margins of heathy bogs and the mountain side where there appears to be not a particle of soil for its sustenance. The Cross-leaved Heath, *Erica tetralix* (Plate 7), is in many places as abundant as the ling, and far more beautiful; the leaves are in whorls of four, the flower stalks white with down, the flowers in clusters of pale pink drooping bells. The Fine-leaved Heath, or Red Heather, *E. cinerea* (Plate 7), is plentiful in almost every district where the ling is found. It may be known by its crowded clusters of flowers occupying about a third of the stem, the colour reddish purple.

The Cornish Heath, *E. vagans* (Plate 7), is not confined to the county from which it takes its name, though it is but rarely met with far away from it. It may be known when met with by its leafiness and its large bell-shaped flowers. We have found this species on several occasions on the boggy parts of Oakshott heath in company with tree-like plants of ling quite three feet high.

In the moist hollows of the moor land we may look for the Bilberry, *Vaccinium myrtillis*, with its myrtle-like leaves and black berries, and the Cranberry, *V. oxycoccos* (Plate 7), with its scarlet berries. These plants are closely allied to the heaths in construction as well as habit.

Many a strange and lovely plant will be gathered on the moorlands differing in type and tone from everything we are accustomed to on fertile lands. If near the sea the Sea Heath, *Frankenia laevis* (Plate 6), may be one of them. The more needful to know this because

it is not an erica or heath proper, but constituting an order far apart, as may be judged by the figure. The Alpine Barren wort, *Epimedium alpinum* (Plate 1), a relative of the barberry, may gladden a toilsome walk up the mountain, with its elegant heart-shaped leaves and delicate four-parted yellow flowers. Its proper season of flowering is May, but it may be found in flower even now. The Red Centaury, *Erythræa centaurium*, a member of the gentian family, with several others of the same genus, now dot the heaths and dry pastures with tufts of exquisitely neat red flowers

If such humble things fail to attract, then haste to the river side and see the great Purple Loosestrife, *Lythrum salicaria*, with its long narrow leaves and gorgeous purplish red flowers, the equal any way of the Foxglove, *Digitalis purpurea*, which ought to be out of flower now, and yet may be found in many a shady nook full of flowers in August. If the appetite for beauty is not yet appeased, search out a shady bank that overhangs a ditch or brook, and indulge in raptures when you find the Great Hairy Willow Herb, *Epilobium hirsutum*, a splendid plant that grows like a shrub, well clothed with downy leaves, and every branch surmounted with myriads of rosy flowers. The long seed capsules of the epilobiums are unmistakeable; yet, though they may remind you of wallflowers and stocks, these plants belong to the same order as the fuchsias, evening primroses, and isnardias.

CHAPTER X.

THE FLOWERS OF SEPTEMBER AND OCTOBER.

RAPID and striking is the decline of flowers as the leaves redden and the days contract in length. Now, as in early spring, the flowers are mostly white and yellow, it is but rarely we meet with shades of red and blue, for those colours belong to the days of prolonged and powerful sunlight, being, indeed, products of sunlight, for King Sol is the painter of all landscapes, and not one blotch of colour occurs upon any picture without his immediate aid. The woods and hedgerows are now decked with myriads of ripe fruits of all kinds, from the dazzling vermilion “hips” of the wild rose, and the quiet scarlet “haws” of the hawthorn, to the blue-black styptic sloe and the jet black juicy bramble berry “whose fruit full well the schoolboy knows.”

In all the dusty highways and on the sunny hedgerows, and in many a great pasture land, the flower of September is the common Ragwort, *Senecio Jacobæa*, which makes a grand display of yellow compound flowers in loose corymbs, rising out of a rustic herbage of lyre-shaped leaves.

A host of near relations of this plant are flowering now. The coarse Marsh Ragwort, *S. aquaticus*, which



COMMON RAGWORT. INFLORESCENCE ARRANGED IN A CORYMB.

grows by the margins of streams, may be regarded as a large edition of the common one. The Great Fen



Germander Speedwell.



Yellow Bedstraw.



Hawkweed.



Ivy-leaved Bell-flower.

Ragwort, *S. paludosus*, occurs in a few marshy spots in the eastern counties; it has clasping lanceolate leaves and large yellow flowers.

The hawkweeds are fully as numerous as the ragworts, but more modest in their frequenting moist and shady places. You will have to work hard to make acquaintance with them all. One that you will meet with in almost any district now is the Common Hawkweed or Mouse-ear Dandelion, *Hieracium pilosella*. It has beautiful yellow flower-heads containing a great number of flat strap-shaped florets in the form of a rosette, and the leaves are undivided. Another common kind is the Wall Hawkweed, *H. murorum*, which grows on walls; the leaves are egg-shaped and toothed, the flowers large and handsome. The Wood Hawkweed, *H. sylvaticum*, abounds in mountainous woods and coppices; the leaves are egg-shaped and toothed, the flower bright yellow. It is a variable plant.

In damp spots near the borders of woods and on cliffs rising above the sea, the Hemp Agrimony, *Eupatorium cannabinum*, makes a conspicuous figure, though it is by no means a handsome plant; as it is neither a hemp proper nor an agrimony proper, its name serves to illustrate the delusiveness of "popular" terminology. It is a robust composite plant, with opposite leaves, three to five-cleft, of a dusty green colour, and dense corymbs of small dingy flesh-coloured flowers. The lively Golden Rod, *Solidago virgaurea*, a member of the same great order, is likely enough to be found as a companion plant, especially on the chalky cliff where plants of commanding aspect can

display their characters distinctly. An autumnal botanizing tour would scarcely be successful if the blue Michaelmas Daisy, *Aster tripolium*, did not occur amongst the findings; but it must be sought in the salt marsh and beside the tidal river, where it imitates the chicory of the dry gravel by its starry pale blue flowers.

Having wandered from the inland hedgerows to the neighbourhood of the sea, it is needful to make note of a few more marine plants. Perhaps the most to be desired for its bold and beautiful character is the Sea Holly, *Eryngium maritimum*, which you will know the first time you see it, though it is not a holly, and quite unlike what it really is, a member of the umbelliferous order. The minute blue, thistle-like flowers, occur in a close head during August, and are succeeded by aromatic seeds.

The Michaelmas Daisy is frequently gathered and sold for another plant of great renown, the Samphire, *Crithmum maritimum*, an umbelliferous plant with fleshy, yellowish green leaves, and thick clusters of greenish-white flowers. This, when pickled with vinegar and spices, becomes a table delicacy, and though now scarcely appreciated, did in old times occupy an important place amongst "sallet herbes." Shakespeare's allusion to it derives its force as much from the then high value set upon the plant, as from the danger of him who gathered it, while swinging perhaps in mid air from the edge of the cliff, hundreds of feet above the chafing breakers. "Dreadful trade!" The Sea Southernwood or Mugwort, *Artemisia vulgaris*, is frequently seen on stony

ground near the sea. It is a plant of no beauty, and quite distinct from the Garden Southernwood, *A. abrotana*, which is not a native of Britain. The mugwort has dark green pinnatifid leaves, covered underneath with cottony down, and small clusters of pale yellow flowers. It is quite odourless. The Sea Wormwood, *A. maritima*, invariably grows in great grey patches, the leaves are downy on both sides, the flowers greenish and small. This plant emits an odour very much resembling that of the garden southernwood.

Returning to the woods we may now hunt in the boggy places for a famous and beautiful plant, the Grass of Parnassus, *Parnassia palustris* (Plate 2), a charming plant of the St. John's wort family, which the figure will represent better than words. It is by no means rare in the north of England, but seldom seen elsewhere. But the south takes revenge upon the north now by presenting on the chalk cliffs the beautiful Perfoliate Yellow-wort, *Chlora perfoliata* (Plate 5), a member of the gentian order, the pale sea-green stem of which runs through the sea-green leaves to carry at its summit a few elegant eight-parted yellow flowers, which open only during sunshine.

"'Tis done! dread winter spreads its latest glooms,
And reigns tremendous o'er the conquer'd year.
How dead the vegetable kingdom lies!
How dumb the tuneful! Horror wide extends
His desolate domain. Behold, fond man!
See here thy pictured life: pass some few years,
Thy flowering spring, thy summer's ardent strength,
And pale concluding winter comes at last,
Thy sober autumn fading into age,
And shuts the scene."

As you will now be making up your herbarium, and recalling on rainy days and long evenings the delightful rambles your dried specimens remind you of, a hint as to the uses of herbarium waste may be useful. Save carefully all the spare tormentils and small grasses, and whatever else appears to be fit for embroidery to be worn by fairies. Mount these delicate scraps with gum on note papers as floral vignettes, and give them freely to those who love you. Subjoined sample of style of mounting may not be unacceptable.



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THE FERN GARDEN

HOW TO MAKE, KEEP, AND ENJOY IT;

OR,

FERN CULTURE MADE EASY.

BY

SHIRLEY HIBBERD,

AUTHOR OF "RUSTIC ADORNMENTS FOR HOMES OF TASTE,"
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BARTHOLOMEW CLOSE.

PREFACE.

BEGINNERS in Fern culture are very much perplexed by the abundance of books on the subject, and their general unfitness to afford the aid a beginner requires. Almost everybody has written a book on ferns, it having become the fashion to consider a knowledge of the subject rather a disqualification than otherwise. When the blind attempt to lead the blind the result can be safely predicated, and no doubt the myriads of bad books on ferns that swarm in the cheap book shops have done their full share of mischief. We have fortunately plenty of good books on the subject, but for the most part they are technical and elaborate, and shoot over the heads of beginners. Some of my fern-loving friends have persuaded me to

try my hand on a small volume adapted for the induction of the unlearned and unskilled in this pursuit, and here it is. Whether it will supersede any of the bad books or take lowest rank amongst them is for me a solemn problem. But I send it forth in hope that after a quarter of a century of hard work in the practical part of the subject, I may be better qualified to make a little book than some of those who, previous to writing, had acquired only a week or so of experience, and a very dim knowledge of about half a dozen species. As almost every fern in cultivation has names enough to fill a small volume, I have in every case adopted the names by which those recommended are best known in nurseries and gardens. The fearful question of nomenclature is thus avoided, and every fern may be found by the name it bears in this epitome.

S. H.

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CYSTOPTERIS DICKIEANA.

THE FERN GARDEN:

HOW TO MAKE, KEEP, AND ENJOY IT;

OR,

FERN CULTURE MADE EASY.

CHAPTER I.

FERNS IN GENERAL.



I HAVE a fine opportunity now for a dry chapter. I have a good mind to hang up a tuft of straw to indicate that the way is dangerous, and to warn the reader not to proceed a line further. Ferns, my friends, belong to the sub-kingdom of vegetables termed CRYPTOGAMIA, a sub-kingdom so named because it is the custom of the population to celebrate marriages in the dark, so that it can scarcely be averred of them to a certainty that they really marry at all. In this sub-kingdom there are several large tribes, such as the mosses, the horse-tails, the lichens and liver worts; but the ferns or *filices* are the most noble of all, associating with others freely, but towering above them in apparent consciousness of right to rule.

All the cryptogams are destitute of flowers; that is one of their most noticeable distinctions. But though flowerless they, for the most part, produce seeds in plenty. Look on the under side of a ripe frond of almost any fern you can get hold of, and you will observe sharp lines, or dots, or constellations of red, brown, or yellow fruit or spore cases; within these are the *spores* or true seeds, by the germination of which the race is multiplied.

Ferns differ from flowering plants in the principles of their construction and growth. If we examine the base of a leaf-stalk of a tree we shall find a bud there, which, if left alone, will produce a branch or a cluster of fruit the next season. There are no such buds in the axils of fern leaves, not even in those of the brake, which is peculiarly tree-like in its growth. The growth of a fern is a sort of perpetual lengthening out at both ends. The upward growth, which is more frequently the subject of observation than the growth of the roots, consists first in a process of unrolling, and then of expansion and maturation of the leaves and stems. Because of these and other characters which obviously and without reference to the peculiar nature of their fruit distinguish them from flowering plants, the several parts of a fern are named differently to the corresponding parts in flowering plants. Thus, the true stem or root-stock of a fern is called a *caudex*, the true leaf is called a *frond*, the stem which bears the leaf is called the *stipes*, and the ramifications of the stipes through the leafy portion corresponding to the leaf-stalks of other plants bears the name of

rachis. These are all the technicalities we need be troubled with, save and except as we go on the names of the ferns themselves. From the sublime to the ridiculous is but a step. I have just made that step while walking through the fern-house to obtain the needful inspiration to write this little book. There I saw my plummy emerald green pets glistening with health and beadings of warm dew, and I thought it might help me if I read their names. Here are a few of them—*Acrostichum Requienianum*, *Alsophila Junghuhniana*, *Anemia Schimperiana*, *Aspidium Karwinskyanum*, *Polystichum Plaschnichianum*, *Asplenium Gaudichaudianum*, *Euphegopteris hexagonopterum*, *Dictyopteris megalocarpum*. You must endure this sort of thing if you purpose giving the slightest amount of attention to ferns, for only a few out of thousands have English names, and to translate the botanical names into English would be very imprudent, not to say sometimes impossible. But I assure you the names do not spoil the plants, they only compel fern books to be ugly and forbidding. Carolina Wilhelmina Amelia Skeggs was an unamiable person, but my *Mohria thurifraga* var. *Achilliaefolia* is as sweet a bit of vegetable jewellery as you are likely to meet with in a day's march, and I am sure you will admire, when you find it, *Didymoglossum* vel *Trichomanes radicans*.



CHAPTER II.



BELIEVE no one can thoroughly enjoy or understand ferns until after having actually hunted for them in hedgerows, woods, and amongst rocks, and rivulets, and waterfalls. The lady fern may be allowed to sing, as Madame Vestris did once upon a time :

Through the woods, through the woods,
Follow and find me,
Search every hollow, and dingle, and dell,
I leave but the print of my footstep behind me ;
So those who would find me must search for me well.

I cannot afford space to enlarge upon the joys of fern-collecting, the pic-nicing, archæologico-exploring, and holiday perambulating that may be associated with the sport. Kindly imagine all this and save me the expenditure of space on anything but the business in hand. Ferns are so widely distributed that wherever a rural walk is possible, it is almost certain that somewhere in the district ferns may be found. The south-western counties of England constitute the home paradise of the fern collector, but, as we must find our happiness where our lot is cast, it is better to make the most of the ferns within our reach than to repine if Cornwall and Devon happen to be *terra incognita*. In the neighbourhood of London are many localities rich in ferns,

but as these are for the most part pretty well known I shall not enumerate them, but proceed at once to make some remarks on collecting ferns for cultivation. It is only during the height of summer that the deciduous kinds can be readily found by inexperienced collectors, and it is at that season that fern hunting proves a particularly agreeable pastime. It would be better always if the ferns could be removed from their native sites when first about to commence their new growth in the spring, and this can be done sometimes by searching in woods and hedgerows for old fronds, and tracing them to their source. The roots should then be taken up without injury to the crowns, and be at once planted or potted as required, and assisted with shade and shelter until established in the places assigned them in the garden. Experienced collectors may hunt for ferns during the winter to great advantage in districts where they are known to abound, as in the event of a mild season many of the deciduous kinds will be still green; and evergreen kinds, such as hartstongue and common polypody, may be better lifted in winter than at any other season. But as a rule fern hunting is a recreation for summer time, and any fern may be taken up in the height of summer and be kept with the utmost certainty for cultivation; the worst that is likely to happen is the loss of all the fronds they carry at the time of taking up; but a new crop will soon succeed them if proper care be taken. The fern collector should be provided with aids and implements adapted to the county in which he is about to make explorations. Where only terrestrial and hedgerow

kinds are expected to be found, a large basket, or better, a pair of baskets of moderate size, such as can be carried one in each hand, will be necessary. They should have close fitting lids, because if ferns are taken up on a hot day and exposed for some hours to the atmosphere, the crowns and roots will be so much exhausted that some may die, and all will be injured, whereas by packing them close with a little moist moss amongst them, the roots and crowns will be kept tolerably fresh until they can be potted or planted out. A short-handled three-pronged fork and a trowel, and a strong clasp knife, will be needful; and in some instances it will be necessary to borrow a spade or digging fork near the spot where operations are to take place, for fine old roots of royal osmund and other large-growing ferns will defy the leverage of all small hand tools. When ferns of large size are taken up in the height of summer, *it is best to cut away all or nearly all their fronds at once, and use those fronds as packing material.*

On reaching home, the best treatment to subject them to is to pot them all separately in the smallest pots their roots can be got into, with cocoa-nut fibre alone or the fibre of good peat or leaf-mould, and shut them up in a frame, and keep only moderately moist until they start into growth. As at this early stage of the study I may suppose you do not know how to pot them and restore their energies, I will endeavour to point out a simpler mode of procedure. Find a very shady place in the garden and there make a bed of leaf mould or peat soil, or cocoa-nut fibre refuse, and plant the ferns in it as close together as possible. Then cover them

with bell glasses or common hand lights, and sprinkle them with water every evening, but take care not to make them very wet at the roots. They will soon begin to grow. In the spring following you may plant them in the fernery.

Small ferns found growing on rocks and walls must always be carefully dealt with. The little maidenhair spleenwort will sometimes send its black wiry roots quite through the substance of a nine-inch or fourteen-inch wall, and to remove it with complete roots is then quite out of the question. By loosening a portion of its hold just below the crown of the plant, roots may generally be obtained sufficient to enable it to re-establish itself under cultivation. A strong chisel and a hammer will be required in undertakings of this sort, and it may be well to add a little discretion also, especially as to extent to which walls—the property of somebody—are to be injured for the sake of a tuft of fern worth but a few pence, and of which specimens may be obtained more easily by further search without any necessity for the infliction of damage. Ferns found growing on and amongst rocks should always, if possible, be obtained with portions of the rock to which they are attached. If this cannot be accomplished, carefully tear the plant from the rock in a way to injure the roots as little as possible; good pieces will soon emit roots and fronds if properly treated, especially if kept moist by packing in moss or sphagnum from the first moment of obtaining the specimen. ✕ Allow me to remark, further, that the passion for fern collecting has in many instances been carried to a ridiculous excess

by persons who merit the title not of fern collectors so much as fern destroyers. Let every genuine lover of ferns be on his guard both to discourage reckless fern collecting, and protect as far as possible the few remaining localities of scarce British ferns. It is not many years since I saw amongst a heap of dried mosses, ferns, grasses, &c., in the possession of a lady, a *sheet* of Tunbridge fern nearly a yard square. This had been torn from its native site, carefully rolled up like a piece of old blanket, and put away, and was afterwards brought forth as a trophy, and preserved as a memorial of the days "when we went gipsying." The value of that sheet when fresh might have been about £5, and no doubt any nurseryman could make a larger sum of a good square yard of the Tunbridge fern. Such reckless destruction, such base contempt for the value set upon a rare fern by those who understand its history and its habits, and appreciate the interest that arises out of its beauty and rarity combined, is to be considered as a crime; and though there is no law to punish the perpetrator, except in cases where there might be an action for trespass or wilful damage, it is the duty of every conservator of our native flora to visit crimes of this kind with the sternest disapprobation, accompanied with truthful explanations of the injury done alike to natural scenery and to science by such acts of spoliation.

If you can dig up ferns in early spring, you may plant them in your fernery at once, and if shaded for a time and frequently sprinkled with water, taking care always not to make the soil about them very wet,

they will soon begin to grow vigorously, and after that patience is the only quality required on your part to ensure your proper reward.

You will soon learn to distinguish ferns from all other plants when you meet with them. When you find a fern, take notice of the soil and situation it is growing in, and in attempting its cultivation imitate those conditions as nearly as possible. The pretty wall-rue spleenwort loves to grow in the full sun, upon and amongst sandstone rocks. You will see plenty of it on the approaches to the Suspension Bridge at Clifton, and you may find the common maiden-hair spleenwort keeping it company if you look sharp. It is in the shady, dank, almost dripping hollow, or on the slope of a water-course, that you are most likely to find the lovely lady fern, the hard fern, and the royal osmund, yet these will sometimes make a bonny show upon dry banks beside a dusty highway, where, perhaps, for miles the common lastrea is the prevailing fern of the district. In Epping Forest there are thousands of pollard trees on the awkward stems of which are perched, like wreaths of honour, tufts of the common polypody. I used when a boy to tear them off to line my basket with when birdnesting, for that forest was my playground. If you want to see the bracken you need not travel far, but if you would cultivate it you must notice that it grows to its grandest stature on mellow, yellowish loam, and is rather poor and stunted on sand and peat, though not always so. Observe always how they look when they are at home, and thereby learn to persuade them to believe themselves

at home when you have planted them in the garden. Some thrive on perpendicular walls of stone and brick, others in the moist woodland shade, others on the bleak mountain top, and many a glorious group may be found on the sides and roofs of caverns, which they make like fairy palaces with their green feathery plumes and golden dottings of mysterious fruit. However many lessons you may learn of the habits of the several kinds of ferns, there should be one lesson impressed upon your mind more deeply than any—it is this, that, much as they love moisture, it is a most rare thing to see a fern growing with its roots naturally in water. When they congregate, as it were, to drink of the brook that passes by, they keep their feet clear away from the current, and lodge safely on the slopes that dip towards the water; or stand proudly upon little islets that compel the stream to sing as it passes them; or on banks and hummocks round about where they can enjoy the tiny splashes the trout make when they leap for flies, and the soft nourishing vapour that rises day and night amongst their shining fronds. Yes, it is upon slopes mostly that ferns love to grow; in places where water rarely lodges, but where moisture is abundant, and there is some shade against the noon-day summer sun. Note all you see of the whereabouts and ways of your favorites, and you will find that there is a better book on fern-growing than the one you are now reading—it is the *BOOK OF NATURE*.



CHAPTER III.

HOW TO FORM AN OUTDOOR FERNERY.



Keep up your interest in the subject, make a fernery at the very outset, even if you do not know the names of half a dozen ferns. If you cannot go collecting you may be able to dip into the tempting basket of the itinerant fern vendor, who is sure to be able to supply you with the Male fern, or *Lastrea Filix mas*, which is the hardiest of all, and will grow almost anywhere; the Lady fern, or *Athyrium Filix fœmina*; the Hard fern, or *Blechnum spicant*; and the Hartstongue fern, or *Scolopendrium vulgare*. With these four you can make a good beginning. 'It is usual to construct the outdoor fernery of some sort of "rockwork," and for two good reasons, first, because the forms and hues of ferns are more effectually displayed when their bright green tufts rise out of grey stones or dark burrs from the brick kiln; second, because they thrive better, when planted in gardens, if their roots are protected from excessive evaporation by the covering of the soil with stones and vitreous masses. Many a tiny fernery do I see in my travels placed at the entrances to country villas and cottages, where I should never think of placing them, yet they look quiet and pleasing, and suggest to all passers by that

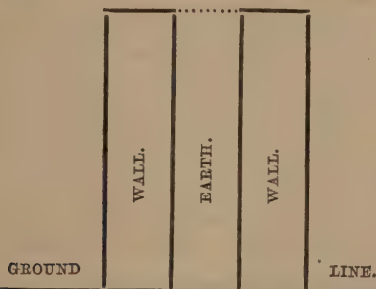
those who planted them did their best to vindicate the quiet beauties of God's great harvest, knowing that for more demonstrative forms of vegetable splendour vindication was unnecessary. When little ferneries like these are constructed, only the commonest and most robust-growing ferns should be planted in them. Generally speaking, the common soil of the place will do, but if a quantity of leaf mould or cocoa-nut fibre can be mixed with it the better. If there is any doubt about the soil of the place being suitable, get some sandy or peaty earth from a common where ferns and heather are found in plenty, and have enough to raise the position above the general level, then cover it with stones or burrs, and plant the ferns between. There are sorts well adapted for this simplest form of fernery, namely, the four just named, as likely to be found in the fern dealer's basket, and the following:—the Bracken or Brake, *Pteris aquilina*, the Broad Prickly Buckler fern, *Lastrea dilatata*, the royal Osmund, *Osmunda regalis*, the common Polypody, *Polypodium vulgare*, the Common Shield fern, *Polystichum aculeatum*. Many more may be added if the soil is a mellow, friable yellow loam, with plenty of sand in it, but it will be well to get a little used to ferns before launching out into grand speculations. When you have had some practice in this humble way, and have, perhaps, succeeded in growing a few ferns in pots in a frame or in a fern case in the drawing-room, you will become ambitious, and resolve on having a grand fernery, with, perhaps, a model of a ruin for the main feature of the scheme.

Outdoor ferneries are usually formed of tree roots and banks of earth, picturesquely disposed and planted with ferns severally adapted to the sites and positions the scheme affords. Where there are living trees on or near the spot (and the shade of large trees is desirable), the use of roots is objectionable, because of the quantities of fungi which are sure to be produced, the mycelium from which may find its way among the living roots and commit vast havoc. But even this danger is worth risking sometimes in cases where roots and butts are plentiful on the spot, and it is undesirable to incur any great expense. The foundation of all banks and earth-works for ferns should be good loam or clay, into which many of the stronger-growing kinds will send their roots when well established. But the upper crust and the stuff for filling in between roots, burrs, &c., should consist of half peat and half silky yellow loam, or some mixture which nearly approximates in character to such a combination. Thus, good loam with well-rotted cocoa-nut fibre, or loam mixed with yellow leaf-mould and manure that has lain by three or four years till rotted to powder. It is best to complete the structure and fill in all the more important places intended for soil before inserting any of the plants, for the simple reason that the work must be firm, the soil well rammed in, and the whole of the scheme so substantial that there will be no fear of any portion shrinking away afterwards, and leaving the roots of the ferns without soil, or causing hollows and crevices between the blocks and the banks into which they are set.



ROCKWORK AND COMMON BRACKEN.

My own outdoor fernery was figured and described in the 'Floral World' of January, 1867. It consists of walls and arches forming a sort of ruined bastion. It is entirely built of "burrs" from the brick kiln, which is the best material for the purpose in districts where rough stone is not to be obtained. All the walls are double, and filled in with strong loam, and, of course, are roughly built, with many crevices and hollows, in which the ferns are planted. These walls may be likened to cases containing earth which is fully exposed on the summit to the weather, and consequently may be regarded as another kind of banks. The annexed diagram will give an idea of the *principle* of construction, though straight lines of course convey no idea of their form.



Where the walk passes through the bastion, the walls rise clear out of the gravel, but all round in the bays and inlets mounds of earth are raised against them, as would be the case in a real ruin, from the accumulation of rubbish. As a hint of the rough construction of the walls, and the nature of the effects produced, here is a "bit" of scenery from the bastion, from a "photo,"

showing how the bracken grows on the rubbish heaps in nooks amongst the walls. The whole scheme is planted with ferns, and various flowering Alpine and rock plants, every position having forms of vegetation suited to it. Thus, at the base, where the walk passes through, there are great tufts of lastrea and lady fern; on the summit, crowning the work, and rooting into the great mass of earth, the common polypody thrives as bravely as on the pollard alders and oaks in Epping Forest. High up in dry positions, on the face of the wall, grow the Wall Rue, *Asplenium ruta-muraria*, the Maidenhair spleenwort, *Asplenium trichomanes*, with many varieties of sempervivum, sedum, thyme, and other plants that love such positions. On the smaller knolls, and in half-shaded bays, where there is a good depth of earth, may be seen lovely tufts of the Parsley fern, *Allosorus crispus*, the most choice tasselled varieties of Harts-tongue, the delicate Bladder fern, *Cystopteris fragilis*. On the banks around, the giant bracken towers up above our heads, and other ferns of large growth congregate in rich masses.

My bastion is part of a screen formed to separate the pleasure division of the garden from the experimental, and with it are connected a number of features, such as a rustic house used as a summer reading-room, a bee-house, some great tree butts planted with ferns, ivies, and grasses. I am satisfied that where space can be afforded the imitation of a ruin is the best possible central idea out of which to develop a fernery.

We shall have to refer to rockeries again in various ways, but as I am resolved to make no long, tedious

chapters if I can help it, I will here offer a few general advices on the formation of ferneries out of doors.

Provide as many aspects and degrees of declivity as possible within certain limits. One slightly irregular bank is to be preferred to a number of paltry ins and outs, but if you have space and materials sufficient, let the work be somewhat intricate in order to obtain a *variety of conditions* to suit the various habits of the ferns you intend to grow.

Large bodies of soil are absolutely necessary, as it is impossible to keep the roots moist enough during the hottest months of the year if they are in shallow soil, of which a large surface is exposed to the atmosphere. It is particularly important to bear this in mind in constructing the walls of a ruin, if it is intended to plant ferns on or in the walls. A space of one foot clear, filled in with earth, between the two faces of the wall, is the least that should be allowed in the smallest construction of the kind; two or three feet of earth will be required in a ruin of dimensions large enough to serve as a garden-house or reading-room.

Aim at wildness and apparent neglect in the arrangements up to a certain point. Dirt and disorder are as injurious to the ferns as to the morals of those who encourage such things, but primness is not desirable in a fernery; the effects should tend towards the *rustic* rather than to the refined, and the materials used throughout should be of the quietest colours; no gew gaws, no plaster casts, no blocks of coral or shiny shells should be mixed up with the work.

Robust-growing ferns planted on banks and mounds

of good mellow loam will scarcely want cultivating. Pretty well the best you can do for them is to leave them alone. But those elevated on pinnacles and in other positions where they are likely to get very dry must have the aid of water, not only in *summer* but in *winter*, also on every occasion when dry weather prevails for any length of time. Many plants so situated perish by desiccation during the prevalence of east winds in March, when because the weather is cold and they are not growing, the cultivator is apt to think water unnecessary; or rather he is apt not to think about the ferns or the water at all.

Small-growing delicate habited ferns that are in exposed positions on rockeries should have protection during severe frost. A flower-pot may be inverted over them or a little clean hay may be placed over their crowns and kept from blowing away by means of a few pegs, or cocoa-nut fibre or sand may be heaped up round and over them, to be taken away of course when the crowns begin to throw up new fronds in spring. Always wait for mild moist weather to remove such protection, for if the swelling crown is suddenly exposed to a cutting east wind, it may shrivel and perish, instead of throwing up its emerald tassels in token of the return of the tender spring.

Thus far we have considered outdoor ferneries as superstructures. We might have regarded them as substructures. At all events, I should like for an old quarry to become mine some day that I might make a fernery of it; and perhaps lacking a quarry, I may be tempted to throw myself into a gravel pit, and by a little hard work and patience make a fern garden of it.

CHAPTER IV.

CULTIVATION OF ROCK FERNS.



YOU have taken notice when fern collecting that many of the smaller kinds are only found on rocks and old walls, or, at all events, are never found in damp hollows or in places over much sheltered from the sun and the breeze. Now, all such ferns require peculiar treatment, and as you advance in practice the rock and wall-loving varieties will probably interest you more than all the rest.

The first requisite to success is to plant them where it is impossible for water to become stagnant about their roots. In planting them on a rockery it is a good plan to take out a quantity of the soil from the place where the fern is to be, and introduce soil specially prepared for it.

In preparing the stations put a lot of broken bricks or broken flower-pots and small stones into the holes, and upon these let there be full nine inches depth of the compost, and let it be raised into a hillock.

Nearly all the ferns of this class will thrive in a mixture of equal parts of yellow loam of a silky nature, fibrous peat or the top crust of sandy soil from a common where the ling and the brake grow together. There must be full one fourth of sand in the mixture, but the

loam or peat may contain as much as that, and no more need be added. If the loam and the peat are both of an unctuous nature, add sharp sand in quantities equal to one fourth or even one third of the bulk, and mix all well together. *Never use sifted soil* for ferns (except in the case of seedlings, to be spoken of in a future chapter), but have all lumps broken to the size of walnuts or hazel nuts, and mix fine and coarse together.

In planting the ferns, those that have a creeping rhizome or root stock must be slightly covered, and it may be necessary to fix them in their places with a few pegs. Do not cover them deeply, only so much in fact as to prevent exhaustion of the rhizomes by drying winds until they can make fresh roots, by which time the frequent sprinklings they are subjected to will have washed the mulching off the rhizomes, which will then be left in their natural position *on* and *not in* the soil.

It will be well perhaps to make a few remarks on the species which come into this group. *Allosorus crispus*, the mountain parsley fern, makes a charming tuft on a rockery; it is fond of stone, and abhors damp. I find that a mixture of equal parts peat, decayed cocoa-nut fibre, and broken pots or broken hearth-stone suits admirably. It must be shaded, or the new growth soon goes rusty.

Asplenium adiantum nigrum, the black maidenhair spleenwort, is rarely met with but in positions elevated above the ground; it greatly needs shade and shelter, and will thrive in any peaty mixture, or in broken pots alone.

Asplenium ruta muraria, the wall rue, requires a very



dry and open position, and will do well in a mixture of two thirds broken bricks and chalk, and one third sandy peat. Stagnant moisture will be speedy death to this fern, but it must have daily sprinklings while growing to promote free growth.

A. septentrionale, the forked spleenwort, should always be grown in an elevated position for the sake of the protection thereby afforded it against slugs and woodlice, which rarely get into the higher parts of mural ferneries. Being very small, it may be easily lost when planted on banks or level ground; but in a suitable pocket in a sheltered nook in a wall or ruin, it makes a very pretty and interesting patch.

Asplenium trichomanes, the common maidenhair spleenwort, and *A. virides*, the green spleenwort, are superb wall ferns, and in fact they rarely do well under cultivation except when planted out in an elevated and well-drained position. The soil should be equal parts sandy peat, yellow loam, and broken bricks, and the plants should be planted firmly, with their crowns slightly above the surface.

Ceterach officinarum, the scale fern, is essentially a wall or rock fern, and a very beautiful and interesting species. Confinement and damp are most prejudicial to this fern, and when planted on a rockery under glass the most airy position safe against drip should be chosen. Any good sandy soil will suit it.

Cystopteris montana, the mountain bladder fern, requires peculiar care. Select for it a position thoroughly sheltered and shaded, and prepare for it a station with a stratum of broken bricks for drainage, and over that

six inches of a mixture consisting of sandy peat, sphagnum, and broken sandstone or common hearthstone. Plant in the centre of the station, and place a bell-glass over; keep constantly moist, and give air periodically. When it is well established, remove the glass, and leave it to take care of itself. If the fernery is supplied with a stream of water, *Cystopteris montana* is one of those which should be planted on a ledge of rock where it can have the benefit of a daily trickling of water over its rhizomes.

Lastrea montana—the hay-scented fern, better known, perhaps, as *L. oreopteris*—requires similar treatment to that recommended for *Cystopteris montana*, but should have a soil more inclining to loam. It can scarcely have too much water, provided the position in which it is planted admits of it readily flowing away.

Polypodium vulgare, the common polypody, will grow in almost any position except in a sheer marsh, and there it soon perishes. When growing wild in the woods, whether on pollard trees or moist banks, it is invariably found rioting in deposits of leaf-mould and wood rotted to powder. Pure cocoa-nut fibre, or equal parts of the fibre and mellow loam, pure leaf-mould, and very dry, tough, fibry peat, in which there are old hummocks of grass, are soils that suit this fine fern to perfection. It will bear sunshine well, but grows more luxuriantly in the shade. In a very dry position where no water can lodge about it, but sprinkled daily all the summer, this fern will attain to grand dimensions, and be one of the most beautiful in the collection all through the autumn and winter months.

Polypodium Robertianum, the limestone polypody, requires a dry position, and a mixture of sandy loam and chalk.


Woodsia ilvensis, the oblong Woodsia, must have shade and shelter: and the most perfect drainage. Make a little hollow of broken bricks, or other porous substances. Fill with a mixture of yellow loam and silver sand. In this the plant will luxuriate.



GROUP OF SCOLOPENDRIUMS ON ROCK-WORK.

CHAPTER V.

CULTIVATION OF MARSH FERNS.

 HIS will be a very short chapter, just because there are no marsh ferns. I remarked as much in Chapter III, and pointed out that the most moisture-loving of them managed usually to keep out of the water. But you may wish to plant some ferns beside a stream, or on an islet, or near a fountain, or in some other peculiarly damp position, and it will be proper here to name the most suitable.

Osmunda regalis, the royal fern, delights in moisture, especially if it is growing in a great bed of spongy peat. With such aids and a warm climate it will overtop the tallest man, but if it only attains a height of five feet, it is a noble object, as much like a palm as any plant of English growth.

Athyrium Filix fœmina, the lady fern, delights in a similar position. This has no palm-like aspect, but is rather to be compared with a plume of ostrich feathers of the most intense and delicate tint of yellowish green.

Lastrea thelypteris, the female buckler fern, is another charming species for a very damp position, and it spreads fast, literally carpeting the ground with pale greyish-green most delicately textured fronds.

Blechnum spicant, the hard fern, will attain grand

dimensions, and produce abundance of fruitful fronds in damp spongy peat. I never saw this and the *Osmunda* grow so grandly as in a wet gully I struck upon once when fern hunting in a wood near Oakshot in Surrey. There the *Osmunda* was my equal in stature, and the fruiting fronds of the *blechnum* just reached my chin. It was a very damp spongy spot, yet the ferns stood a little above the water line.

Charming plants to associate with the moisture-loving ferns are the *Equisetums* or Horsetails. Get *Equisetum sylvaticum* if you can, and plant it in wet spongy peat in a sheltered nook, and you will have a bit of vegetation that will make you proud of the land of which it is a native,—that is, if you happen to be a true Britisher, which the plant is,—if not, be glad now and then that you came here, for if this is not in any especial manner the land of ferns, it is at all events the land of people who love them.



ATHYRIUM FELIX FÆMINA, VAR. FRIZELLÆ.

CHAPTER VI.

FERNS IN POTS.



LET us now make another advance in practice. Ferns are beautiful objects when well grown as pot plants. To grow them well in pots demands more care and skill than growing them in the rockery, because there they, for the most part, take care of themselves. But pot plants are at all times more dependent on the cultivator, and must have constant attention. If you fail at first do not be discouraged, for the practice is attended with but few difficulties. Begin with a few of the commonest, and do not make a rush at rare varieties, until you have got your hand and your *mind* in the work. It is a great secret of success in cultivating any particular class of plants *to get used to them*.

There is a whole volume of philosophy in the last sentence, and it applies directly and peculiarly to the subject now before us. Whoever hopes to succeed in fern growing must first grow a few in order to get used to them, and having got used to them operations may be extended and money may be spent with some prospect of remuneration; but whoever attempts too much at first will find that effort and money and hope and enthusiasm have been wasted, for disappointments in the early stages of a pursuit

are ten times more dispiriting than when they occur after we have been rewarded with many successes. —

Suppose the beginner in fern growing to take in hand a dozen species only; what shall they be? I should recommend the following:—*Lastrea Filix mas*, *Lastrea dilatata*, *Polystichum aculeatum*, *Polystichum angulare*, *Polypodium vulgare*, *Polypodium dryopteris*, *Athyrium Filix fœmina*, *Asplenium marinum*, *Scolopendrium vulgare*, *Cyrtomium falcatum*, *Woodwardia radicans*, *Lomaria chiliensis*. These are among the cheapest and most easily procured. The first eight of them are British, and the remaining four foreign. Supposing them to be all small nursery plants, they might all be potted in five-inch pots, or what are termed 48's, but the size of the pot must depend upon the size of the plants, and that size will suit which will take their roots without cramping them, and allow very little space beyond. Fine specimens can be grown with more certainty by shifting them into larger and larger pots as the plants increase in size, beginning with pots as small as possible without cramping the roots, than by putting them into large pots in the first instance. The soil that would suit all these would be such a mixture as the following: one part peat, consisting of the top slice of turf, and which consists chiefly of the fibre of fine grasses, the roots of heaths, decayed moss, &c. This must be chopped up the size of walnuts. One part friable yellow loam of a clean *silky* texture, such as will crumble to powder between the fingers, and yet scarcely soil them even when it is moderately damp. If this is full of fibre of grass turf,

and has the fleshy roots of brake intermingled with it, all the better. Such loam as this is very abundant, indeed it generally prevails where the brake grows luxuriantly in the hedgerows. One part thoroughly decayed leaf mould, which should be black and gritty, free from fungus, and from bits of iron and other rubbish which gardeners too often allow to get mixed up with it. One part silver-sand. Mix these ingredients well together; break all lumps to the size of walnuts; do not sift it, and do not on any account endeavour to make it fine like dust. Indeed, *a compost as fine as dust will not grow any plant to perfection.* When prepared, the sand should be visible throughout the mass, giving it a grey hue and a granular appearance. It should be only moderately moist, *not wet*, free from large stones, and have a pleasant feel in the hand. Now draw to one side a heap of the toughest and largest pieces of fibre and loam from the mixture; this we shall call *rough stuff*. Next lay ready for use a small heap of green moss, or, if not green, tolerably tough and fresh, that is to say, not rotten. Next break up a lot of flower-pots to the size of crown-pieces, and another lot to the size of peas. The last job preparatory to potting is to have new or quite clean pots. If they are not clean inside and out, the ferns will not thrive, and if they did we should not like them for it.

✓ The process of potting is very simple, yet it is usually badly done by beginners. First place over the hole in the pot a picked potsherd, hollow side downwards; then lay, also hollow side downwards, a few pieces all round, to cover the bottom of the pot, and then add a

good handful of the smallest potsherds. Next spread a thin layer of moss, then a thin layer of the rough stuff, and then take the fern in the left hand and place it with the crown in the centre, level with the rim of the pot, and allow the roots to spread, so that when earth is put upon them they will not be cramped up in a bunch. Take the compost in the right hand, and pour it in all round till the pot is full, and then with the thumb of each hand press it down, turning the pot round in so doing, adding more soil as required, so that when finished there will be half an inch of space between the soil and the top edge of the pot. There is a golden rule for success in growing any kind of plant in a pot, and it is *to pot firm*. Do not be afraid to press the earth in round the roots, and give the pot a tap on the board at the finishing touch; when potted loosely, no plant can thrive. ✓

Now, what are we to do with this dozen of ferns? I propose that we fit up a frame to face the north in some quiet corner of the garden, and that we make no boast about our ferns until they have had one year's growing at least. We want a dry spot, rather sheltered; the soil on which the frame is to stand should be covered with coal ashes, and be easy of access at all seasons. Suppose we have potted them from the 30th of March to the 1st of May—ferns may be potted at any time, but when they are just starting into new growth is the best time—the next question is, What shall we do with them? It is but little they require; first place them in the frame, next water them with a common watering-pot with a fine rose on the spout. When you get used

to ferns, you may water them without the rose, unless you wish to wet the fronds, but you must use the rose now, because, as you are not used to them, you might wash half the earth out of the pots by a sudden dash of water, a contingency not possible when the rose is used in watering. All through the summer these plants will want a little water every other day at least, and it should be given so as to wet the fronds all over, and moisten the soil *without drenching them*. In very hot and very dry weather daily watering will be necessary, and in the very hottest weather you may water twice a day with benefit.

Not less important is the giving of air and light. If the frame faces north, the light may be stood up on end, leaning against the back, so as to form a sort of south wall to the plants, and a mat hung on it, or a breadth of canvas tacked to it will render it efficient to screen off the full blaze of sunshine. If this cannot be done, put the light in its place, lay a mat upon it and draw it down, and tilt it slightly with blocks of wood or empty flower-pots, so as to allow a current of air to pass through. In this state it is to remain from the 1st of May to the 1st of September, *during the day time only*. Every evening—at sunset or earlier—draw the light off altogether, that the plants may have the full daylight as long as it lasts, the dews all night, and the full daylight again in the morning till about 9 a.m.

On the 1st of September your plants will have a most luxuriant appearance, and the pots will be crammed full of roots. Shift them all into pots the

next size larger without breaking their balls of roots, and let the operation be performed in precisely the same manner as already described. Take off the shading, and give the plants very much air both day and night for another month. During very bright sunshine shade them for an hour or two; but let them have the sunshine morning and evening, and the night dew. Continue to water as before, but give less and less, so that by the 1st of October they will be watered only once a week. After that date, until frost occurs, shut them up at night, take off the light all day, and once a week pour water gently over their crowns, sufficient to make the crowns moist, but not to sodden the soil in the pots. When frost occurs, throw a few mats on the light; if the frost increases in severity, take off the light, and strew *dry hay* amongst the plants, taking particular care to cover their crowns with this protecting material. Put the lights on, lay some dry straw or hay on the glass, and then lay a good mat over all. If you neglect these precautions, you will probably not lose any of your plants, for they are all hardy; but the effect of frost upon them will be that they will be a week or two later in growing in spring than if they had been protected, and so I must insist on protection as necessary.

Whenever the weather is mild, or the frost only amounts to a few degrees at night, continue to pour a little water over the crowns once a week; in fact, that operation is only to be suspended when the weather is really severe. Give air as often as possible, never allow them to become thoroughly wet, and keep them safe from being frozen.

The majority of amateur fern growers allow their pot plants to go dry as dust all winter, and the consequence is that they grow very poorly in the early part of the following season ; in fact, scarcely grow at all till June, by which time their new fronds ought to be all completed. It is a grand secret of success to keep their crowns freely moistened all the winter long.

The next best time to shift them will be the 1st of March. Proceed as before, using pots one size larger. You will now have fine specimens. The frame will no longer hold them. You must either build a greenhouse to keep them in, or you must have a pit of sufficient depth to give them head room, or you must make a rockery and plant them all out in it, or you must divide them all by splitting them asunder with a knife right through the crown, and pot all the pieces, or you must sell them and retire on the proceeds. It cannot be my business what becomes of them after this date ; it suffices that I have made a fern grower of you, and you will be enabled to understand and practise all the directions and suggestions on fern growing which you may find in this volume or any other that may be worth referring to. You will have learnt that a clean, granular, peaty, fibrous soil ; a rather still, warm, and moist atmosphere, and shade from sunshine, are the principal essentials to success in fern growing, and to make short of this part of the paper, I may as well say that you have very little more to learn in the way of principles ; if you are ever to excel in fern growing, it will be owing to the use you make of observation and experience in carrying those principles into effect.

CHAPTER VII.

THE FERN HOUSE.

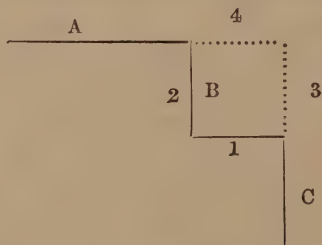


WE are now becoming “expensive and hard to please.” We want a fern house—oh dear! how our wants increase with increase of knowledge and advance of taste. Any man could live contented on just double the amount of income he has already, and the fern grower at any time could promise to be satisfied if he could be sure of advancing from a frame to a house, or from a house to another and a larger house, and from such ferns as anybody could grow in a modest cool fernery to tree ferns of gigantic growth, and the gorgeous *Leptopteris superba*, which is perhaps the loveliest fern in the world, and rather too dear as yet, and needing too much care for the humble fern grower ever to dream about it.

By a fern house I mean some sort of cave or rockery covered with glass and with or without heating apparatus. The best example of a fernery of this sort I know of, to which the public have access, may be seen at Messrs. Veitch and Sons’ nursery, Chelsea. It is truly a garden with gravel walks amidst rocks and waterfalls, and on every hand the ferns present themselves in sheets of delicious verdure or in waving palm-like masses, or in a glorious confusion of brake and lastrea intermingled

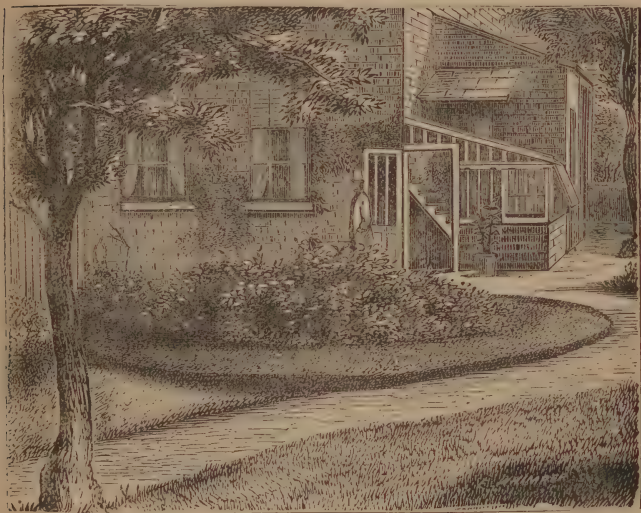
as if the dryads themselves attended to the planting. I could mention hundreds of private gardeners where I have seen beautiful ferneries under glass, but the reader would gain nothing by the list. Pardon my boldness, but in truth I have scarcely met with a fernery to surpass Mrs. Hibberd's in beauty and interest, though it is on an extremely small scale. I will tell you something about it.

Given, a recess in the walls of a house, and what shall we do with it? It is of no use to put the question to echo, who is represented as giving answers as required, because an honest echo could only reply, "Do with it!" which, at the best, would be ambiguous, and might be supposed to mean, "Do *away* with it!" In a certain sense that is just what I have done; for, by converting the recess into a fernery, it is a recess no more, but a part and parcel of the garden, and yet not utterly separated from the dwelling-house. Please allow a few hap-hazard lines to represent the case in the first instance. If you suppose A to be one side of the house,



and C another side, then B will be the recess or hole in the wall requiring to be occupied in some way or other, or by some construction to be blotted out. Letter A

looks west, letter C north ; the garden-walk passes by the side of the house along the line A, and past the gap B ; and as long as that remains a gap, it is abominably ugly. It is twelve years ago since I filled up the gap B with a lean-to greenhouse, with the slope of the roof looking west, and the door on the side which looks north. Fig. 1 is the back wall of the house, fig. 2 the



end wall, fig. 3 the door, fig. 4 the front. This was at first used as a small show-house, for, being easy of access, always in sight, and in a shady position, it served the double purpose of displaying a few good things in a place where it was convenient to see them, and also, by reason of its cool, shady position, keeping them longer in perfection than they would have remained in

any more sunny position. In the cut the house is shown with a stage for flowering plants, as originally constructed. In the course of time, some building and planting took place a little way off towards the west, and the nice gleam of sunlight that enlivened the house from 2 p.m. till sunset was effectually blocked out, and the house became unfit for flowering plants. Instead of bringing an action against the neighbour who devoured my sunshine, I brought an action against myself, and the verdict was, that the shady house should be forthwith converted into a fernery. The stages were removed, and in their place a rockery was built upon a very simple plan, and which, considering the smallness of the house, proves delightfully effective, as affording at all seasons a beautiful scene, and very serviceable arrangements for the growth of plants. I employed a skilful bricklayer to do all the solid work, and, under my direction, he faced the back and end walls of the house (1 and 2) with a rugged mass of burrs from the brick-field, rendering it somewhat like the interior of a cave. The work was commenced at some little distance from the wall, and gradually brought nearer and nearer as it proceeded upwards, occasional large blocks being firmly cemented to the wall, and strengthened with holdfasts; and between the walls and the burrs good loam was rammed in from bottom to top. Next the front wall (4) and the end (3) a low border was formed with a facing of burrs, this border consisting of good loam. No special device for drainage was resorted to, and it has never been wanted; a layer of broken bricks, about six inches deep, was put upon the tiles, and the

soil thrown upon this rough bed. There is a trapped sink leading to a drain in one corner of the house, and all superfluous water finds its way there quickly, as the pavement slopes gently to it. The finish of the work I did myself, and it occupied me, at odd times, about four months, the work being essentially amusing, though attended with an occasional abrasion of the knuckles. The task I had was to make the "pockets"—openings for the purpose being left at intervals in the work. I made the "pockets" and planted the ferns at the same time. Some of the larger ones are planted in projecting receptacles, just as the bricklayer left them; but generally speaking, I found it the best plan to stuff the necessary soil into a chink or gap, then place the fern in it, and, lastly, to introduce a piece of burr of suitable size to close it in, and this was done with the help of cement. I do not think I can profitably occupy further space with remarks on the formative part of the affair; details of this kind do not admit of being described minutely; all I can say in concluding this part of the history is this, that I never did a better job in my life; for not only have the ferns and mosses planted in it thriven amazingly, but the scene produced is exquisitely beautiful and affords more than a suggestion of the

"Negligence of nature, wild and wide."

It is of the utmost importance to inform the reader that the house is not heated. It is remarkably proof against frost, which I attribute to the fact that the back wall (1) forms one side of the drawing-room, which is kept at a comfortable temperature all the winter, and of course the wall itself is in winter always warmer

than the atmosphere outside the house. That frost does get in, however, is certain; the thermometer several times indicated five to ten degrees of frost inside, and when the case has become in any way serious, Hays's constant stove or Hinks's petroleum stove has been set to work to keep all safe until the weather changed for the better.

A fern house is a genuine luxury, which every lover of ferns should have if possible. Amongst its many advantages, a few must be named as particularly worthy of attention. It affords, even without the aid of artificial heat, opportunity for growing a number of nearly hardy ferns which need some protection, yet are not much hurt if they have to endure a few degrees of frost. Ferns of this class are numerous and extremely beautiful. I will name four only now as a key to the rest in illustration of this particular advantage—*Woodwardia radicans*, *Cyrtomium falcatum*, *Adiantum pedatum*, *Todea pellucida*. Another advantage is that if planted only with the hardiest British ferns, they grow more beautifully than the same sorts do in the open air. As a winter garden and as a peculiarly charming scene—if well done and well kept—the fern house is worth something to a home bird, and as an amusement for an invalid it is invaluable.

The management is a modification of that advised for the outdoor fernery, but watering must be more regularly performed, and if fast growing ferns run riot and overrun the others they must be kept in check by occasionally digging out their roots. *Lastrea thelypteris* and *Onoclea sensibilis* are likely to do this, but

they are such lovely inmates of a cool fernery that you cannot do without them.

During the summer the roof must be shaded with thin "scrim" or "tiffany," or a smear of whitewash. At all events, it will never do to allow powerful sunshine to shrivel up the tender growth and change the glistening green to dingy brown, as it will do very soon if there is no shading used.

A very small amount of ventilation will be required if the house faces north, as it should do. A fern house in a hot southern exposure would need abundance of air, heavy shading and extra help from the garden engine from the 1st of May to the 19th of September. After the last-mentioned date it might be left alone for ever, for one season's struggle against overwhelming odds ought to be enough for anybody. Choose or make a shady place for your house, and then see that, as the rockery is built up, there is a good body of earth for the ferns to root into.

Constant attention will be requisite to keep the fern-house as beautiful as it should be. Dead fronds must be removed without injury to the young fronds that are rising; some ferns will need more water than others, and in the height of summer the floor must be wetted daily to cause humidity of the atmosphere.

The following ferns have prospered in the house during the past twelve years, all of them having been at times exposed to a few (say half a dozen) degrees of frost. It must be borne in mind that they can better endure frost if planted out than in pots.

LIST OF FERNS FOR PLANTING OUT IN A GREENHOUSE FERNERY :

LARGE GROWING FERNS.—*Woodwardia radicans* and *W. orientalis*. Plant these about five feet above the ground, that their drooping fronds may be seen to advantage. *Cyrtomium falcatum*, a rigid grower, often and appropriately called “the laurel fern.” *Onoclea sensibilis*, suitable for a cool damp nook on the ground line, as it is an upright grower ; under glass it is a magnificent fern. *Lomaria chilense*, a rigid habited fern with bold dark green fronds. *Pteris flabellata*, grand pectinate fronds, of a vivid light green colour, suitable for a shelf or bank three or four feet above the ground. *Pteris cretica albo-lineata*, an upright grower, spreads freely at bottom. *Phlebodium sporodocarpum* requires a well-drained elevated ledge, from whence it will put forth masses of tawny roots and handsome glaucous fronds. *Polystichum acrostichoides*, a bold habit, and a good companion to *Lomaria chilense*. *Lomaria magellanica*, *Lastrea intermedia*, *L. frondosa*, *L. Sieboldii*, *Asplenium angustifolium*, *Adiantum pedatum*, *Athyrium asplenioides*, *A. tenuifrons*, *A. filix-fœmina v. corymbiferum*.

MEDIUM GROWERS.—*Davallia canariense*, *Asplenium Michauxii*, *Adiantum cuneatum*, *A. assimile*, *A. affine*, *A. formosum*, *Asplenium bulbiferum*, *A. angustifolium*, *A. athyrium filix fœmina v. Frizelliae*, *A. f. f. v. corymbiferum*, *A. f. f. v. crispum*, *Scolopendrium vulgare v. crispum*, *S. v. v. alciorne*, *S. v. v. ramosum*, *S. v. v. ramo-cristatum* (and a dozen others of the same series desirable), *Lastrea thelypteris*, *L. æmula*, *L. Goldieana*, *L. filix-mas v. cristata*, *Polypodium dryopteris*, *P. aureum*,

P. phegopteris, *Platycerium alcicorne* (suitable to suspend on a block of wood ; it is almost hardy). *Todea pellucida* (this grows finely in a cool house, if in a damp, shady, and *still* place ; wind it cannot endure).

FOR ELEVATED POSITIONS IN THE FRONTS OF ROCK-ERIES—that is to say, to grow as wall ferns, and all requiring plenty of air : *Asplenium trichomanes*, *A. adiantum nigrum*, *A. marinum*, *Ceterach officinarum*, *Allosorus crispus* (a sunny position near the door will suit this and *Asplenium trichomanes*), *Polypodium vulgare* and its varieties, especially *Cambricum* and *Hibernica*.

The most hardy of the tree ferns is *Dicksonia antarctica*, which is as easy to grow as a common *lastrea*, provided it has enough water.

FOR BASKETS, take *Pteris scaberula*, *Adiantum setulosum*, *Asplenium flabellifolium*, *Camptosorus rhizophyllus*, *Davallia pyxidata*, *Niphobolus lingua*, and any of the free-growing hardy ferns that run about freely, such as *Lastrea thelypteris* and *Onoclea sensibilis*.

If you should wish to create in your house or out of doors a constant trickling of water for the benefit of some fountain-loving ferns or mosses, take any large vessel, in the bottom of which you can break or bore a small hole. Cover the hole with a flat tile, and over that put two inches of the finest sand. Fill the vessel with water daily, and it will run gently as long as there is a drop left at the fountain head. If an ornamental vase should be used for the purpose, it might be utilized by placing in it a pot containing some semi-aquatic plant.

CHAPTER VIII.

THE FERNERY AT THE FIRESIDE.



THOUSANDS of amateur fern growers have only a glass case in the sitting-room for a fern garden. In the heart of a great city where gardens are unknown, and even the graveyards are desecrated by accumulations of filth, the fern case is a boon of priceless value. It is a bit of the woodside sealed down with the life of the wood in it, and when unsealed for a moment it gives forth an odour that might delude us into the belief that we had been suddenly wafted to some bosky dell where the "nodding violet grows." Before we go a step further it is but just to the memory of a good man to call to mind that for many years the structures now commonly called "fern cases" were known as "Wardian cases," being the invention of the late Mr. B. N. Ward, an eminent surgeon, many years resident in Finsbury Circus, who died at a ripe age in 1868. Peace to his memory! He not only added to the embellishments of the English home and the recreations of English domestic life, but his invention has been of incalculable service in the introduction of valuable exotic plants to this country, for if shut up close in Wardian cases they travel over

sea far more safely than by any other system of protection.

The simplest form of a fern case is the bell-glass and flower-pot, of which the annexed sectional figure affords an accurate representation. This particular form of pot was invented by Mr. Fry, of Lee, and is made by



Mr. Pascall, a potter at Chiselhurst. It can be obtained of the dealers in ferns, and forms a very neat table ornament, as the pot is made of fine red ware and is roughly ornamented.

Another form of the same kind of thing consists of a glass dish with rim and bell-glass, the whole very neatly finished, and forming, if skilfully fitted, a most elegant miniature fern garden.

Fern cases constructed of wood or metal frames, with boxes or troughs for soil, have been made in endless

variety, yet for real utility and beauty of appearance there are none so good as those of the simplest rectangular outlines, such as may be readily obtained of any of the leading dealers in such things. All things considered, the cases known as “Miss Maling’s,” which



may be heated if required by means of gas flame or hot water renewed periodically, are the best, because of their extreme simplicity and the uninterrupted view they allow of the interior. We are supposed to be great in fern cases—I say *we* in the way of the organ blower in

the story; but *Sine qua Non* is the master of them here; and they comprise cases of several kinds, some rather gigantic in dimensions, besides vases fitted with lanterns of plate glass, in which not only climbing ferns and ferns of many other kinds, but climbing ivies, lycopodiums, and such odd things as the artillery plant are grown. I have had to make as well as furnish plant cases. We have between us managed to exhibit a considerable number, and step by step we have acquired some very definite ideas about them, which I shall endeavour to set forth categorically.

In the case of fern shades which fit into glass dishes, and which, as long as there is water lodged in the rim into which the lower edge of the shade rests, are air-tight, air must be given three times a week by removing the shade altogether for an hour or so. This allows the excess of moisture to dry off the foliage, and prevents mould; and the glass getting dry in the meanwhile, it is prepared to take up a fresh supply of moisture from the soil when replaced, which is equivalent to a circulation of water as well as a change of air. This air-giving, however, must be regulated by discretion, for if the air of the room is hot and dry sudden exposure of the plants to it may do them harm. Moreover, it is a very easy matter to remove the glass and *forget* it, the result being, perhaps, complete destruction of all the more tender fronds, and the disfigurement of the affair for a fortnight. Now, a very simple and expeditious and effectual mode of ventilating consists in taking off the glass, wiping it dry and bright, and replacing it at once. There is then no fear of forgetting it.

It is important in choosing fern shades of this description to see that the glass dome fits *loosely* in the pan which accompanies it. One of our shades, which was a tight fit, was one day removed into a sunny window for a few hours to make room for some domestic operations. The sun heated the air within the shade, the expanded air had no means to escape, and it burst the shade with a loud explosion into a multitude of fragments. A guinea's worth of glass was thus lost in a moment, and a collection of Selaginellas placed in jeopardy through neglect of this precaution.

Success in these matters often turns on points of management that appears trifling; let me, therefore, describe the process of planting a fern shade. If intended for a winter ornament, it should be planted in July or August, that the ferns may be established before the decline of the season, and if they are ever-green kinds they will have plenty of time to throw up an abundance of fine fronds, which the liberal supply of water from below, with regular ventilation, will render luxurious and beautiful; and before winter comes, the excess of moisture will be gone, but the soil will hold enough to render watering almost unnecessary until spring. In a large pan—say, six inches depth—lay down two and a half inches of broken flower-pots or cinders of the size of walnuts; on this lay a thin coating of half-decayed moss or sphagnum. Fresh green moss is apt to go sour or breed fungi, and therefore it is preferable if it has been for some time exposed to the action of moisture. Fill up to the level of the rim with a mixture of turfy peat, small broken

charcoal, and the siftings of broken pots, varying from the size of a hazel-nut to that of a pea, with plenty of silver-sand. I never measure the ingredients of any compost, but the beginner may like to be saved from doubt, and therefore let the proportions be taken as follows:—Peat three parts, silver-sand one part, broken charcoal and crock-siftings one part. This compost should be broken up and mixed with the hand, and should be in a free lumpy state. Ferns will never prosper if the compost is sifted, but a little of the finest of it should be put aside to dress the surface with when the planting is completed. Now, take a can of boiling water, and water the soil till you have supplied enough to rise to the top of the drainage. The water should be poured into the centre first to warm the soil gradually; poured against the glass suddenly it may shatter it. I have used the boiling water now for many years on every occasion of planting a fern case, and have not yet had one accident. With a little caution there is no risk. The use of the boiling water is to destroy every insect that may have escaped your eye when breaking up the peat. It will not only do that, but kill their eggs also, and equally make an end of the seeds of weeds and the mycelium of fungi; all of which are enemies better got rid of at first than to be hunted for when their ravages become a source of alarm. The over cautious may of course scald or bake the materials before filling the pan; in that case they must not be put in the pan until nearly dry again.

When the pan is nearly cold the ferns may be planted, and the process of planting will consolidate

the compost, so that it will, when all is finished, be an inch below the edge of the pan, as it ought to be; it may indeed go below that, and need filling up with some of the finest of the mixture, which should be sprinkled over as a finishing touch.

In any case of difficulty in obtaining peat of a friable and fibrous texture for fern cases, a mixture of equal parts of cocoa-nut fibre refuse and charcoal dust will answer admirably.

I could enumerate fifty groups of ferns offhand suitable for bell-glasses, but tastes differ, and the best possible way to please yourself is first to obtain a sufficient number of ferns of *suitable kinds* and arrange them as you think best. I will, however, as my journal of fern work is at hand while writing this, give you the planting of a bell-glass measuring twenty-two inches across which I once planted for a friend who knew well how to manage these things, and who was pleased to say that, though very fastidious on matters of taste, she was well satisfied with my way of doing things.

In the centre *Cheilanthes farinosa*, the most accommodating of all the silver ferns. At regular distances round it *Adiantopsis radiata*, *Cheilanthes tomentosa*, *Asplenium fragrans*, *Asplenium vivipara*, *Pteris argentea*, a little silvery gem, *Elaphoglossum brevipes*, *Doodia lunulata*. All over the surface, so as to quite cover it, *Selaginella apoda*.

The following are six beautiful ferns adapted for glass shades in the hands of beginners; in fact, if they are not drowned with water, and have but a moderate amount of light, they are sure to thrive even if neg-

lected for weeks together. *Asplenium marinum*, the sea spleenwort; *Doodia caudata*, *Scolopendrium vulgare ramo-marginatum*, a tasselled variety of hartstongue; *Asplenium viride*, the green spleenwort; *Adiantum setulosum*, *Lomaria lanceolata*.

Let us now consider the Fern case proper, and first as to how it should be made.

Elegance is a prime requisite, but as tastes differ we shall say but little on that point. The lighter the structure consistent with safety the better. We do meet with very ugly fern cases at times, and the ferns within them are usually in a bad state of health. The fact is, heavy framework and cumbrous ornaments *obstruct the light*, and therefore ugly fern cases are, as a rule, to be condemned for that reason, if for no other.

A simple rectangular figure as indicated in the simple sketch annexed is undoubtedly the best for all general purposes; moreover, this box-like form may be made the basis of an elaborate design: out of it may rise a miniature mosque or a Crystal Palace, as I have shown by figures in the chapter on Fern cases in "Rustic Adornments." A figure of the best fern case we have ever had was published in the 1st volume of the "Floral World;" it is a handsome case made of Ransome's imperishable stone, surmounted by a tall lantern.

At every step in designing and constructing it must be borne in mind that ferns are to be grown in the case, and, therefore, it must afford access to light and air, and egress for water.

Accessibility to the ferns is of the utmost importance. If the case is small it should be possible to lift off the whole of the glass framework at any time. If too large



RECTANGULAR FERN CASE.

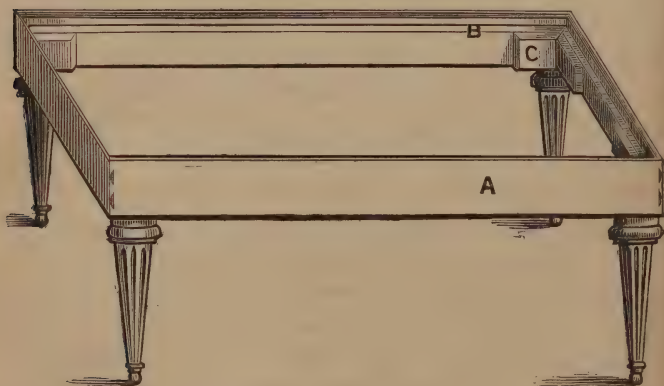
for that there should be doors on two sides, because in reaching across from one side to plant a fern on the

opposite side some mischief may be done. The case figured on p. 50 may be taken to pieces in a few seconds, as each sheet of glass is fitted in a separate frame, and all the frames drop into grooves and are braced together at the corners by means of small hooks and eyes. The patent cases made by Gray of Danvers Street, Chelsea, are of this make, and they have the additional advantage of a boiler to afford warmth from below; this boiler requires to be filled only once or twice a day in winter according to the severity of the weather. Ventilation is easily effected without causing a draught by simply tilting up the top glass.

It is a great convenience if a fern case can be moved about without difficulty, and it is astonishing what may be accomplished in this respect by the exercise of forethought. For example, if you buy one of Gray's cases it will be supplied on a miserable set of legs with wooden castors, and even if a small one it will be difficult to move it. But if you follow our plan the difficulty vanishes, and you may take your fern cases with you on your travels, or at all events wheel them from room to room with a mere touch. The legs sent with the case are converted into firewood, and the case is put on a strong framework made by our own carpenter, of which the annexed figure affords an accurate representation, save and excepting one particular.

The frame figured is one on which stands a case measuring three feet long, two feet high, and eighteen inches wide. The frame consists of a skirting-board, A, with neatly-moulded top edge, six inches in depth, mounted on four neat but strong legs, which are fitted

with large brass castors, all wooden and iron castors being rubbish. From the ground to the top edge of the skirting-board the measurement is seventeen inches. The case does not stand *on* this frame, but *in* it, that is to say, it rests on the half-inch ledge, B, which extends all round inside, and which is added to at the corners by the blocks, C, which are placed there to increase the strength of the frame. The advantage of this mode of mounting is not in appearance only, though that is of some importance in an article intended for the adornment of a chamber. One important advantage is the ease with which the case can be moved about ; an immoveable case is a nuisance except in some peculiar circumstances. The engraver has forgotten to add the castors.



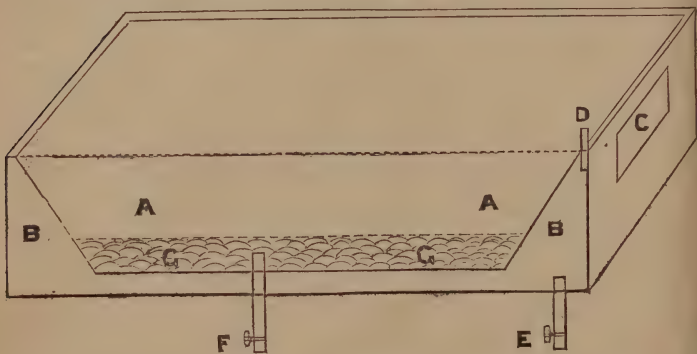
That there should be means of escape for surplus water is desirable, but not absolutely necessary. The experienced cultivator will never allow a fern case

to become so saturated with water as to be hurtful to the health of the ferns ; but the beginner is almost sure to fall into this error, and the first disaster that occurs is, nine times in every ten, to be attributed to a waterlogged condition of the roots. Make it a point to ascertain, when purchasing a fern case, if there is any perforation of the base to allow of the escape of water. If there is none you must be the more cautious to avoid charging the soil with excess of moisture. It is thought to be impossible to provide drainage in those cases which have boilers beneath, but I think it may be done, and I hope some day to find time to carry out my views.

For the benefit of mechanical and experimental readers, here is my idea of a fern case combining means of heating with effectual drainage.

I would go to the expense of having all the metal work in copper well tinned ; it would be expensive, but would last for ever. A, should be a trough for soil, resting on a ledge all round the inside of the outer wooden casing, and admitting of being lifted out at any time. For the lifting there should be a ring attached on each of the four sides. In the centre of this I would insert a pipe, F, for escape of drainage, and this very simple process makes an end of the principal difficulty. The bottom of the trough might slope down every way to the pipe, F, which would render its action more effectual. For the communication of heat I would have a space, B, allowing a depth of two inches at least under the bottom of the trough, and additional spaces under the sloping ends of the trough. By increasing the

quantity of water so as to fill the ends as well as the bottom, a maximum of heat would be obtained. Now, to fill this reservoir need not be so ridiculous an affair as it is at present; my idea of the matter is to have a whole side of the wooden frame removable at a touch, so that we could get to the reservoir and fill it with as much ease as one might fill a washing-tub. I have shown a removable portion only of the end C. I must leave it to the imagination of the inventive reader to work out this point, confident that he will have no



A, trough containing soil for ferns; B, reservoir for hot water; C, opening for filling reservoir; D, air pipe; E, tap to draw off water from reservoir; F, tap to draw off drainage water from soil; G, stratum of crocks for drainage.

difficulty in opening the side of the case so as to pour water into the reservoir with some speed from a large can, instead of dribbling it in as now in a way that suggests that fern-growers ought to live for ever if only for the sake of keeping their cases warm. The pipe, F,

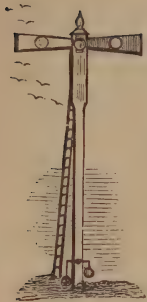
would have to be a fixture, with a close-fitting india-rubber ring surrounding it where it enters amongst the crocks at the base of the trough, A ; this, of course, prevents the water from B rising up amongst the soil and flooding the ferns.



ROSHER'S FERN PILLAR.

CHAPTER IX.

MANAGEMENT OF FERN CASES.



THE DANGER SIGNAL is hoisted here to attract attention. From first to last you must guard against drowning your pets, for that is the calamity that befalls thousands of ferns in cases. It is the one only important point to be constantly kept in mind, it is the only big rock you will have to encounter in your pleasant voyage of discovery round the room in search of fern island. So long as the soil is moderately damp water need not be given to the roots ; but at almost any time a slight shower over the fronds by means of a syringe will be beneficial. In winter the syringe must be cautiously used, and if there are any gold or silver ferns in the case, care should be taken to prevent a single drop of water falling upon them, as the farina with which they are covered ought never to be washed off. Air must be given regularly and with judgment ; a brisk breeze will do much mischief, and as dust is to be kept out as much as possible, do not open your case while sweeping is going on, or when, through open doors and windows, a young hurricane is enjoying his gambols.

Beautiful effects may be produced by a judicious use

of mimic rockeries, and they are useful as affording elevated and well-drained sites for small ferns of delicate growth. The best material for constructing rockeries, arches, &c., is common coke. It adds but little to the weight, and it may be made to look like stone by soaking it with water and sprinkling it with Roman or Portland cement. For the formation of irregular mounds and to dot about amongst the ferns to vary the surface, soft sandstone or rough and rather soft pieces of brick burrs should be preferred, not only on account of their suitable colours, but because they soon get coated with natural growths of moss and add much to the beauty of the little garden. But the grand thing is to have a sufficiency of healthy ferns of handsome varieties, everything else must be made subsidiary to that desideratum. Have good ferns and grow them well, and you will not be greatly exercised about the niceties of gimcrackery.

Vermin of many kinds occur in fern cases in spite of all precautions; mysterious nibblings of fronds are noticed, sometimes the crown of a valuable plant will be found eaten away. The marauders may be woodlice, slugs, or the larvæ of small beetles. Trap them, if possible, by inserting fresh lettuce leaves in the chinks you suspect they frequent. Or place slices of fresh apple under tufts of moss. Examine the baits daily, and keep them always fresh. If you can put a few glowworms in a case infested with vermin, there will be a rapid clearance made; toads are good vermin killers, but they do not add to the beauties of the scene, and they are apt to squat on the tender rising fronds of

some delicate fern, and do more harm than good. Green fly, or aphis, is rarely seen in fern cases, and when it occurs it is usually a sign that there has been neglect in giving air. The best way to remove

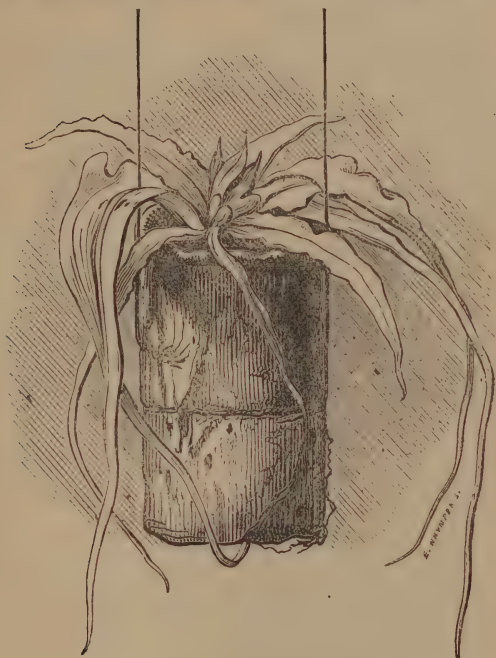


ADIANTUM SETULOSUM.

the aphis is by means of a soft brush or camel's-hair pencil, and to prevent its recurrence give more air.

For suspending ferns in cases, the outside husk of the cocoa-nut may be used, and also the hard inner shell. For general purposes the latter is preferable.

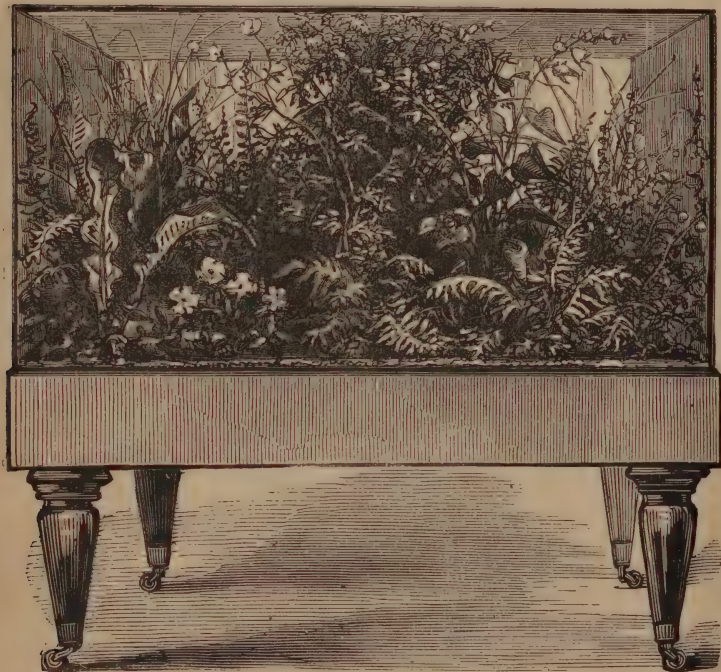
If broken with a clean edge half a shell makes a capital basket. It requires a sharp saw and some patience to cut the edge nicely if it is much jagged. The holes must be burnt in the shell, as they are apt to split if any attempt



CAMPTOSORUS RHIZOPHYLLUS.

is made to pierce them with awl or gimlet, and, besides that, they are so hard that the best bit of steel breaks like glass against them. Make three holes for drainage, and two very small holes near the rim, exactly opposite each other, and use for suspending a silver string of the Spanish guitar, which will never rot, and is as soft

and pliable as packthread. The two ferns here represented are examples of my mode of suspending. The *Adiantum* is in a cocoa-nut, bored all over with holes a quarter or third of an inch in diameter, and it has pushed crowns through every one of them, so as to



smother the outside with foliage. The *Camptosorus* is in a little case formed of thin bark, bound with brass wire. To water these, the best way is to lift them out and lower them into a deep vessel, with a stick passed through the suspending cord and laid across the top of



ACROSTICHUM QUERCIFOLIUM.

the vessel, so that they can sink the full length of the cord and be thoroughly saturated. They can be lifted out in a quarter of an hour, and allowed to drip for a few minutes by again lodging the stick at each end in a suitable place.

THIRTY FINE FERNS FOR CASES WITH ARTIFICIAL HEAT. The best for beginners marked thus *.

Anemidietyon phyllitidis,* 9 inches; *Aneimia adiantifolia*,* 9 in.; *Asplenium bifidum*, 18 in.; *A. fragrans*, 9 in.; *A. heterodon*, 12 in.; *A. radicans*, 9 in.; *A. Mexicanum*,* 6 in.; *A. polymorphum*,* 4 in.; *Blechnum lanceolum*,* 4 in.; *B. intermedium*, 6 in.; *Campyloneurum lucidum*, 12 in.; *Cheilanthes micromera*, 12 in.; *Diplazium radicans*, 9 in.; *Elaphoglossum brevipes*, 6 in.; *Fadyenia prolifera*, 3 in.; *Acrostichum quercifolium*,* 4 in.; *Polypodium loricum*, 12 in.; *Hemionitis cordifolia*,* 4 in.; *Hymenolepis spicata*,* 9 in.; *Hypolepis tenuifolia deformis*, 12 in.; *Litobrochia leptophylla*, 18 in.; *L. pedata*, 6 in.; *Lomaria attenuata*, 12 in.; *L. Patersoni*, 9 in.; *Nothochlæna vestita*, 6 in.; *N. tenera*, 6 in.; *Olfersia cervina*,* 18 in.; *Pleopeltis percussa*,* 12 in.; *P. membranacea*,* 12 in.; *Pteris calomelanos*,* 6 in.

THIRTY FINE FERNS FOR CASES WITHOUT ARTIFICIAL HEAT. The best for beginners marked thus *.

Asplenium appendiculatum,* 12 in.; *A. attenuatum*,* 4; *A. crenulatum*, 18; *A. dimidiatum*, 9 in.; *A. nitidum*, 6 in.; *Adiantum tinctum*, 12 in.; *A. assimile*,* 9 in.; *A. cuneatum*,* 18 in.; *A. cristatum*, 9 in.; *A. formosum*,* 18 in.; *A. fulvum*, 12 in.; *Doodia aspera*,* 12 in.; *D. caudata*,* 6 in.; *D. lunulata*,* 9 in.; *Las-*

trema acuminata,* 8 in.; *L. glabella*, 8 in.; *Niphobolus lingua*, 9 in.; *N. pertusus*, 6 in.; *Nephrolepis pectinata*, 18 in.; *N. exaltata*,* 30 in.; *Onychium Japonicum*,* 15 in.; *Platyloma rotundifolia*, 18 in.; *Pleopeltis pustulata*, 9 in.; *Phlebodium aureum*,* 36 in.; *P. sporodocarpum*,* 30 in.; *Polystichum triangularum*, 6 in.; *Pteris crenata*, 12 in.; *P. geraniifolia*, 9 in.; *Pteris cretica albo-lineata*,* 18 in.; *P. heterophylla*, 6 in.

TWENTY-FOUR FINE FERNS FOR SUSPENDING IN CASES.
The best for beginners marked thus *.

Adiantum setulosum,* 6 inches; *Asplenium brachypterum*,* 6 in.; *A. flabellifolium*,* 9 in.; *A. pinnatifidum*, 6 in.; *A. reclinatum*, 6 in.; *Camptosorus rhizophyllus*,* 5 in.; *Cheilanthes sieberi*, 10 in.; *Davallia pentaphylla*, 9 in.; *D. bullata*, 6 in.; *D. dissecta*, 18 in.; *D. elegans*, 12 in.; *D. solida*, 6 in.; *D. pyxidata*, 18 in.; *D. canariensis*, 12 in.; *D. decora*, 6 in.; *Humata heterophylla*, 6 in.; *Hypolepis amaurorachis*, 18 in.; *Niphobolus lingua*, 9 in.; *Nothochlæna nivea*, 6 in.; *Oleandra nodosa*, 6 in.; *Pleopeltis lycopodioides*, 3 in.; *P. stigmatica*, 6 in.; *Polypodium rugulosum*,* 9 in.; *Pteris scaberula*,* 12 in.

FORTY SMALL-GROWING CASE FERNS, SUITABLE FOR A FERN PILLAR OR ROCKERY.

British—*Adiantum capillus veneris*, *Asplenium fontanum*,* *Asplenium germanicum*,* *Cystopteris regia** (deciduous), *Polypodium dryopteris* (deciduous), *Scolopendrium vulgare bimarginata cordatum*,* *S. v. cristatum minus*, *S. v. divergens*, *S. v. geminum*, *S. v. glomerato-digitatum*, *S. v. lacerato-marginatum*, *S. v. proliferum*, *S. v. ramo-marginatum*,* *S. v. ramo-*



WATERBURY'S HERB.

proliferum, S. v. ramosum, S. v. Wardii,* Woodsia alpina (deciduous), Woodsia ilvensis* (deciduous).—


Exotic—Camptosorus rhizophyllus,* Lomaria alpina,* Acrophorus hispidus, Adiantum setulosum,* Asplenium flabellifolium,* Asplenium attenuatum,* Asplenium brachypterum, Asplenium nitidum,* Asplenium obtusatum, Asplenium pumilum, Asplenium pinnatifidum, Blechnum intermedium,* Campyloneurum cæspitosum, Diplazium plantagineum, Davallia decora, Elaphoglossum brevipes,* Gymnopteris quercifolia, Goniopteris scolopendrioides, Lomaria lanceolata,* Nothochlæna vestita, Nothochlæna tenera,* Plecopeltis stigmatica, Doodia caudata.*



PTERIS TERNIFOLIUM.

CHAPTER X.

THE ART OF MULTIPLYING FERNS.

 HERE are two modes of increasing ferns—by division and by spores. Both plans are easy enough up to a certain point, but we need not trouble ourselves about the point at which serious difficulty commences, for in truth no beginner should be troubled on that score. I will suppose you have a large plant of the common Male fern (*Lastrea filix mas*) or of the common Hartstongue (*Scolopendrium vulgare*), and you wish to make more of it at once. The best time to operate is when the fronds are just rising in the spring, but it may be done at any time if proper care be taken. We take the plant out of its pot, or lift it out of the ground by means of a fork or trowel, and lay it on a board or table. Probably at a glance you will discover that a number of distinct crowns, each with a tuft of roots attached, may be easily removed from the outside by the use of a strong sharp knife. Separate such offsets, carefully disentangle their roots from the mass, and at once pot them in very small pots in the sort of mixture already advised for use in growing pot ferns in Chapter VI. Prepare the pots by putting in them plenty of small crocks for drainage, over them a thin wisp of dry moss, or a bit of fibre torn from the peat,

then put the little plant in its place and fill in round the roots and press moderately firm. If this is done in spring before the fronds have unrolled, you may be content to give a little water and put them in a frame and keep shut rather close until they begin to grow, giving very little water until they have made some progress. If you have no frame, the pots may be placed in any sheltered shady corner on a bed of coal ashes, and will almost take care of themselves. But the old plant remains, not much diminished in size by the removal of the offsets. Lay it on its side and carefully pass the knife through the centre of it, and as it separates into two portions, you will probably see how to divide it yet further without using the knife again, securing to each piece a *centre* or crown, and a tuft of roots. Treat these in the same manner as the offsets; or, if you have not rashly torn the plant to shreds, you may at once plant the divisions in the fernery, filling in round its roots with your best mixture of sandy peat, and pressing each firmly in its place. A little shade, and occasional sprinkling, will assist them to become established, and they will soon take care of themselves.

If you were to proceed in a similar manner with the same plants in the summer time, when crowned with luxurious leafage, you would have to be as quick as possible about the work, and pot all the pieces and shut them up in a frame for a fortnight, to recover and make fresh roots, during that time taking care to sprinkle them frequently and also to avoid making the soil in the pots very wet, for too much moisture to

roots of any kind that have been disturbed and need time to regain their wonted action is like poison.

So much for the division of ferns that form clustering crowns. Let us now take a tuft of common polypody. Here we find a quantity of fleshy rhizomes of the thickness of a lead pencil entangled amongst masses of fibrous roots. You may cut or pull to pieces this tuft almost *ad lib.*, provided each separate position has its own roots reserved to it. The pieces must be potted rather differently to the others, as their roots run upon the surface chiefly, and they thrive best in a moist spongy material. The surest way to make plants of them will be to prepare the pots by putting in at least one third depth of crocks, then nearly fill them with sandy peat, and on that spread a little cocoa-nut fibre to make a soft bed; then lay one of the pieces on the bed, put some more cocoa-nut fibre over it almost to bury it, and press it down firmly. Water and place in frame and treat as in the first practice. They will soon begin to grow, and will want no particular care after a few weeks.

Now, by these two methods may the greater part of all known ferns be multiplied; there are exceptions, as in the case of tree ferns, for example, but the exceptions are few. Those that grow in clustering crowns may be divided as in the first practice, those that extend by creeping rhizomes may be cut to pieces as in the second practice.

As you extend your operations, you will not be long in discovering how easy it is to kill ferns by one or the other of these processes. For general guidance I will

say, then, be sure before you begin that you know what you ought to do. If you cannot see how to divide a plant without spoiling it because it neither offers you offsets, nor a crown large enough to be severed without danger, leave it alone, be content and wait. The habits of different species must be observed also if the cultivator would become expert in propagating. Take for example *Onoclea sensibilis*, a charming flowering fern for a damp place in a rockery out of doors or under glass, which I hope you will obtain at the first opportunity, if you do not already possess it. Now, this fern propagates itself; that is to say, the rhizoma runs along near the surface, and at some distance from the parent plant throws up several distinct crowns. Leave the plant alone for a couple of seasons and it will be surrounded by, or rather it will consist of, a number of separate centres of growth forming a large rich mass of vegetation. You may divide this into as many pieces as you please, provided each piece has its own centre and tuft of roots, and make plants of them all with patience aided by shade and moisture. Take on the other hand a potted *Gleichenia* that has been in the same pot two or three years, and you will find it dead in the centre, but all round next the pot will be a series of crowns. Carefully knock it out of the pot, lay it on its side, pass the knife through it, separate the pieces and shake from them the old worn-out soil and pot as before; but in this case put the plant into a warm pit or some other place where it can have a temperature of 60 to 70° with shade and a humid atmosphere, to encou-

rage a new growth. The principle is the same in every case, but as different classes of ferns differ in constitution, so the practice must be varied to suit them.

In every case of multiplying by division it must be borne in mind that the operation severely taxes the energies of the plants, hence the need of extra care for some time afterwards to restore their vigour. The soil in which small offsets are potted may with advantage contain more sand than strong plants require, and it may be quite fine in texture, whereas for strong plants it is best somewhat lumpy. So, again, extra warmth and occasional damping of the crowns, and a humid atmosphere with shade from sunshine, are aids of great importance. Begin with cheap hardy kinds, and take as much pains with them as you would with the most tender and costly, and you will enjoy the work, be rewarded with success, and acquire experience for higher flights in a most amusing pastime.

“If at first you don’t succeed,
Try, try, try again.”

Now for the spores; and first by way of preface. The spores of tropical or hothouse ferns must be placed in heat or they will not germinate. The spores of greenhouse ferns may be raised in summer time without the aid of artificial heat, but it is a safer plan to put them into a propagating house and treat them the same as the tropical kinds until the little plants resulting from their germination have made some progress. As for the spores of hardy ferns, they may be raised in a frame kept close and shaded

First secure some large shallow pans, and bell-glasses to fit them. Of course common flower-pots will answer the purpose, but large shallow pans are better. Nearly fill the pans (or pots) with broken flower-pots, the top stratum of which should be broken to the size of peas. Sweep all the dust made in breaking the pots into the pans with the smallest of the crocks, and then put in an inch depth of a mixture of equal parts fine peat and silver sand. Water with a fine rose, and if the watering washes the fine stuff down, and causes the points of the small broken pots to peep through, all the better—that is as it should be. Now take a *ripe* frond of a fern on which there is plenty of fruit, and while holding over the prepared pan, sweep the hand over it, or tap it smartly, and you will see the fine dust—the veritable fern seeds—fall freely. Regulate your movements so as to scatter the dust all over the surface, and then put on the bell-glass.

The proper place for pans so prepared is wherever they can be kept warm and dark, and yet be within sight, so that they are not neglected. They must be kept always moderately moist, but never wet, and as watering with a water-pot would simply wash the seed away, follow the neater practice of placing the pans in vessels of water. If they are immersed in one inch depth for an hour, the whole mass will become moist throughout by capillary attraction, and not a grain of sand or seed need be moved from its place.

Have patience, and you will see first a film of green *confervæ*, which is a good sign, next little leafy growths, resembling the liver worts or *marchantias*. By-and-bye

from these curious leafy things little fern fronds will rise, and you will know thereby that you did not sow the seed in vain.

Be in no hurry to disturb the little plants. More and more will appear; they will crowd and jostle one another, and they will form a sort of microscopic forest, and very likely will appear to be very different in form to the frond from which the seed was taken, for they do not usually acquire their true characters until they have made some advance. The time will come at last to give them more room, but before you disturb them remove the bell-glass, and habituate them to the enjoyment of more air and light than they had in their earliest infancy. I usually allow seedlings to remain a whole year in the seed pans, and then pot them off, and this plan will be found a safe and good one for general adoption.

The process of potting consists in lifting each little plant with its tuft of roots unhurt into a very small pot nearly filled with a mixture of fine peat and sand, and then covering its roots with the same material, and tucking it in comfortably. Shut them up in a frame in a greenhouse, or put them close together under large bell-glasses; by some means or other keep them comparatively warm and shaded; give gentle sprinklings or rather *dewings* over their leaves, and but little water to the roots, and they will soon grow and become bonny little plants.

In a rather dark and damp corner of one of my greenhouses I have a glass frame on a stand which is used expressly as a nursery for seedling ferns. You

might make one for yourself by taking a shallow box, and covering it with sheets of stout glass. Make a bed inside the box of a few inches depth of cocoa-nut fibre, or silver sand, or clean small pebbles, and on this bed place the little pots and put the glass over. You have complete command over them by this plan to kill them by excess of shade and moisture, or by exposing them to sunshine; or to make them grow by giving moisture and shade enough to keep them in the first instance, and to admit more light and air, to strengthen them as they advance and become strong enough to be shifted into larger pots. Small fern cases with moveable tops make admirable nurseries for seedlings when they are grown in sitting-rooms.

We have spoken of ferns that run about and multiply by means of their rhizomas. A parallel case is seen in ferns that shed their spores, and sprout up into life without aid from any one, and almost anywhere. It will be amongst your earliest surprises and delights in fern growing to find seedlings in your fern cases, on the banks, and walls, and stones, and even pavements of your fern-houses, and in crevices of the rockery out of doors. Some ferns increase spontaneously with such freedom as to become weeds, but the wise man will not despise them on that account. He will be quickened in love and thankfulness to God for making beauty so cheap on the face of the earth. He will rejoice that the humblest and least enlightened cannot fail to see that in the mystery of life is afforded us deep and blessed impressions of the direct relationship of the Divine nature to the manifestations of the Divine will in visible things.

To the observant mind there is nothing trivial or paltry in nature, and the growth of a fern seed is the beginning of a mysterious life, the end of which no man can predicate or understand.


Behold! we know not anything;
I can but trust that good shall fall
At last—far off—at last, to all,
And every winter change to spring.



ADIANTUM EXCISUM MULTIFIDUM.

CHAPTER XI.

BRITISH FERNS.

HE number of known ferns is about 3000. How many are unknown we cannot even rudely guess. The British species number 46; many of these present us with varieties in great abundance, that is to say, with forms differing from their types (or what we regard as types), and these varieties number full 500, and no living person possesses the whole of them. It is not the business of this book to treat of ferns botanically, nor to speak of the British ferns exclusively, yet it would hardly be complete—restricted as its object is—unless it contained at least one chapter on the Filices of Britain, more especially as many persons only cultivate the British ferns, and find enough to amuse them in the fern way in making collections of native species and varieties. Let no one suppose a *complete collection* to be desired, for it is not, except for strictly scientific purposes. It matters little for our purpose whether it be desirable or not, for the fact is, a complete collection has never been formed and never can be. My excellent friend Mr. Sim, of Foots Cray, Kent, enumerates in his last catalogue 365 British species and varieties in all—enough for us to

choose from for the materials for a fern garden. If the reader has no innate horror of statistics, a few figures may be interesting. It must be understood that amongst the *varieties* are many extremely curious plants. Some are richly tasselled and fringed, some have duplicated fronds, and the variations otherwise comprise imitations (or resemblances to) stag's horns, frills, fans, wires, bristles, embroidery, braiding, puckering, and embossing. Some of the varieties are notched as if a child had cut faces out of them, others are shrunk up to mere stalks; some have spores on the wrong side, that is to say, on upper side of the fronds, others never produce spores at all, and a few produce their offspring ready made in the form of little plants at the points of their fronds or on every part of their leafy surface. Some varieties are so curious, so rare, and so difficult to multiply that they range in price from one to five guineas a plant. This need not terrify the humble fern collector, for many of the handsomest may be bought for a shilling each. The catalogue prices of 319 kinds enumerated in Sim's catalogue amount to £130 16s.—say if those not priced be added, £200 for one plant each of the 365. The varieties of hartstongue alone are about 100 in number, and to buy one each would cost in the aggregate £50. Here ends the statistical statement. Now let us hastily run through the list of British ferns, saying nothing about synonyms or knotty points in classification, for with these matters we cannot now have anything to do. For our purpose an alphabetical arrangement will be best.

ADIANTUM.—*A. capillus veneris*, the true maiden-



ADIANTUM CAPILLUS-VENERIS.

hair. There are a few varieties, but we need not enumerate them. The requisites for the growth of this lovely fern are warmth, shade, and moisture. In the damp and rather dark parts of a plant stove it soon becomes a weed, and sows itself by spores on bricks, stones, wood—anywhere. I have had it grow to perfection between the bricks inside a well. To have a plant in a room, the best way is to appropriate to its use a fifteen-inch bell-glass, fitted to an earthen pan of red flower-pot ware. The soil should be sandy peat, with a fourth part of broken flower-pots or soft broken stone added. Give air daily for half an hour; never leave the glass off and forget it; do not saturate it with moisture, and—*have patience*.

ALLOSORUS.—*A. crispus*, the mountain parsley fern. Coddling will kill it. It loves fresh air; will grow amongst pebbles or broken stone with a little sandy peat to give it a start. Shade is good for it, but I have seen it growing gloriously in the full sun. *Beware* if there is one snail in the garden; catch him and throw him over the wall into the next garden, or he will gobble up your plant as a cat would a mouse. It is a good plan to put a bell-glass over a newly planted piece to protect it from the vermin; the glass can be taken away when the plant has grown a bit.

ASPLENIUM.—*A. marinum* is one of the best case ferns known. It loves sand and stone, and warmth and vapour. To plant it in the open air rockery is a risk, but it will do well in the cool fern-house near the floor.

A. trichomanes and *A. viride* are charming ferns to

plant in a cool house or a case, or in sheltered chinks in the open rockery. If it should ever speak it would be in such words as once startled the horticultural community, "Give me air or I shall die." Soil to be bricky and sandy; fat peat is poison to it.

A. fontanum—a gem for the case.

A. ruta-muraria.—Stagnant moisture is ruin to it; plant with the crown quite above the surface; soil one half broken brick or stone, the other half very sandy peat. A lovely fern for planting in a chink in an old wall in a shady sheltered spot.

A. septentrionale, a difficult fern to grow. Try it in a pot in a frame, in soil three parts sand and soft stone, and guard it with fear and suspicion against slugs, snails, and woodlice.

ATHYRIUM.—*A. filix-fœmina* is the Lady fern, and well deserves the title. Please excuse description or eulogy; see it and believe. It will grow anywhere under glass, or in the open air, if in a shady moist position. I have a grand plant growing in the gravel walk at the foot of the bastion, and more than I can count in other places. A fine pot fern, growing well in fat peat or in common loam, with sand, or in any soil not chalky, with the help of a little cocoa-nut fibre to mellow it. Be sure to drain the pot effectually and give plenty of water. Oh, how it will smile upon you if you treat it kindly!

The following varieties are fine—*Coronans*, *Corymbiferum*, *diffuso-multifidum*, *Elworthi*, *Fieldiæ*, *Frizelliæ*, *grandiceps*, *Grantiæ*, *multifidum*.

BLECHNUM.—*B. spicans*, the hard fern, is a noble

and very distinct fern. Try your hand at a large pot specimen—when four or five years old it will be grand. A rather strong soil, with good drainage, suits it; say yellow loam three parts, leaf mould two parts, and grit



ATHYRIUM FILIX-FEMINA, *var.* CORYMBIFERUM.

obtained by sifting the sweepings of the gravel walks one part. By the way, this is a capital plan of obtaining clean sharp sand. We rarely buy sand, as we sift all our sweepings and spend the sand money in keeping the gravel perfect.

The following varieties are good—*imbricatum*, *lanceifolium*, *multifurcatum*, *ramosum*, *strictum*.

CETERACH.—*C. officinarum*, the scaly spleenwort, is



ATHYRIUM FILIX-FEMINA GRANDICEPS.

a very interesting fern. It grows luxuriantly in our cool fern-house, in a chink of the rough wall near the door. A good pot fern. It loves air, stone, old mortar,



GYMNOCRAMMA LEPTOPHYLLA.

shade, and *perfect drainage* ; try it as an aquatic, and say "farewell" to it before you begin.

CYSTOPTERIS.—*C. fragilis*, the brittle bladder fern, is well adapted to plant in the front of a rockery. With one exception, the varieties are worthless, but *Dickiana* (frontispiece) makes amends for all. *C. montana*, the mountain bladder fern, and *C. regia*, are gems. These do best in the open air or cool greenhouse. They need shade and shelter, but love fresh air. Prepare a bed a foot square by removing the soil a foot deep. Then partially fill up with broken bricks and charcoal, and upon this bed place four inches depth of a mixture consisting of equal parts peat, silver sand, the finest dust of cocoa-nut fibre refuse, and soft silky loam. Place the plant in the centre of the bed, close the soil firmly around it, and put a bell-glass over. Take off the bell-glass every morning, and wipe it quite dry, and place it over the plant again. Keep the soil moist, and in due time the plant will grow. After six months of such nursing, it will take care of itself in every respect except one, and that is, it will invite the attacks of snails and slugs, which are very fond of it. These must be trapped and destroyed with energy ; you must be a Thug to such people.

GYMNOGRAMMA.—*G. leptophylla* is the only Britisher of this lovely family. This little gem is an annual. To secure it for ever, get a plant in a pot, and keep it in a fern-house or shady moist pit. It will shed its spores, and the parent plant will perish. The next season it will appear plentifully as a weed on bricks, stones, borders, &c., &c. Pot a few to give away, and allow

the remainder to attain maturity and shed their spores for the next season.

HYMENOPHYLLUM.—*H. Tunbridgense* is the Tunbridge filmy fern, a cynosure, a paragon, a paradox. It represents a race, all of which require similar treatment. They are all easily grown if dealt with in a proper manner in the first instance. Suppose we consider how to grow a nice patch of any of them. Get a large earthenware pan (flower-pot ware) and a bell-glass to fit fairly within the rim. A fifteen-inch glass would be best, but one half that size will do to begin with. Spread over the bottom of the pan a layer of broken pots, then lay down a bed of very sandy peat—say peat and silver sand equal parts. On this bed place some blocks of stone of the size of the fist, and less, and press them down, and fill in between them with the same mixture of peat and sand. Make all this quite firm—make it, in fact, *hard*. Now draw out a small stone, and introduce the plant, spreading out its black hair-like roots, which cover with the mixture, and bed it in close, so that it will sit, so to speak, close to the general surface of the stone. If you can plant little pieces all over the pan between the stones, you may get the pan filled more quickly, but it is a risk for a beginner to tear up a plant as a practised hand would do. Wet the whole by means of a fine syringe; place the bell-glass on, and press it slightly so as to make it fit pretty close, and place the pan in a warm room near the window, or in a snug, warm, shady corner of the greenhouse, or in a cool part of the stove, and do not look at it for a week; then take off the glass and give another gentle sprinkle,



LASTREA ÆMULA.

and next leave it for a month. The plant begins to grow early in the year, and continues growing till quite late in autumn. Keep it only moderately moist at all seasons. Take care the sun never shines upon it, and as far as is possible—making allowances for curiosity, or the necessity of occasionally ascertaining what is its condition as to moisture—*give no air at all*.

LASTREA.—*L. filix-mas*, the male fern, is the commonest (and some say the handsomest) species in Britain. It will grow anywhere and in any soil, but attains its fullest perfection in mellow loam or peat in a shady situation. The following varieties are fine—*cristata*, a magnificent object when well grown; *crispa*, a little gem for the case; *grandiceps*, a fine pot fern; *polydactyla*, a fine-crested variety.

L. æmula, the hay-scented fern, a charming species for the cool house or pot culture. When dried it is agreeably fragrant.

L. dilatata, the broad buckler fern, should be planted plentifully out of doors. The variety *dumetorum* has a beautiful rich appearance.

L. montana or *L. oreopteris*, the mountain buckler fern, common on Scottish moors, and by no means scarce in England and Wales. It should be planted out in loam and be freely supplied with water. It is not a good fern to grow in pots. When the hand is passed over the fronds a pleasant odour is emitted; when dried it has a sweet hay-like scent.

L. thelypteris, a free growing species for the cool house and for pot culture. It loves shade, moisture, and spongy peat, and travels fast.



POLYPODIUM VULGARE.

OPHIOGLOSSUM.—*O. vulgatum* and *O. lusitanicum* are the only two kinds of Adder's-tongue fern in Britain. These should be kept in pots in a frame and conspicuously labelled, as their fronds disappear early in the season, and the plants are likely to be thrown away as dead. Scarcely worth growing.

OSMUNDA.—*O. regalis*, the royal fern, is a most noble plant for the garden, but not well adapted for pots or the fern-house. Plant in moist spongy peat or strong loam. The variety *cristata* makes a handsome pot plant.

POLYPODIUM.—*P. vulgare*, the common polypody, may be grown anywhere and almost anyhow, but prefers a spongy or leafy soil, an elevated position and some amount of shade. It will thrive on the top of an old wall in the full sun if planted small in the first instance, and make a beautiful object on old tree stumps in the fernery. None of our native ferns endure drought so well as this.

The best varieties are *cambricum*, *crenatum*, *cristatum*, *omnilacerum*, and *semilacerum*. The first of these five is the "Welsh polypody," the last is the "Irish polypody;" five charming plants for cool house, pot, or case culture.

P. alpestre, the alpine polypody, closely resembles the lady fern. It will thrive in the hardy fernery if in a well-drained position. Scarcely good enough for pots.

P. dryopteris, the oak fern, a lovely species, the colour of which is a sure cure for bad temper; it is so extravagantly cheerful and so pleasingly delicate. If planted out it must have a very shady, sheltered, moist



POLYPODIUM VULGARE, var. CAMBRICUM.

place. It is one of the best ferns in the world for a ledge of rock in the cool fernery, or to grow in a large shallow pan as a specimen.

P. phegopteris, the beech fern; distinct and pretty, growing freely out of doors with the help of shade and moisture. A fine fern for pots and to plant near a fountain, as it attains its fullest beauty only in an atmosphere heavily charged with moisture. It must, however, be perfectly drained at the roots.

P. Robertianum, or *P. calcareum*, the limestone polypody, a pretty and peculiarly greyish-coloured plant which loves chalk or limestone rock, but will grow in almost any soil, and will endure the sunshine as patiently as *P. vulgare*.

POLYSTICHUM.—*P. angulare*, the soft, prickly shield fern, is the choicest of this section, a truly fine plant, sporting much and good in every form. It is so common that it will occur amongst the earliest “finds” of the fern hunter. It loves shade and a sandy, loamy soil, or leaf soil, but is not particular.

The following varieties are invaluable for pot culture, and the smallest of them well adapted for cases,—*concinnum*, *cristatum*, *grandiceps*, *grandidens*, *latipes*, *plumosum*, *proliferum*. The last named is a charming fern for pot culture, and thrives alike in frame, greenhouse, or stove.

P. aculeatum, the prickly shield fern, is at once distinct, bold, and handsome. Plant it in a shady spot and leave it alone for several years if you wish to see it thrive. A fine pot fern.

P. lonchitis, the holly fern, a handsome military-



POLYPODIUM ALPESTRE.



POLYPODIUM DRYOPTERIS.

looking fern, rather difficult to manage, but deserving good generalship. If planted out give it a shaded, sheltered spot, and at least half a barrow full of a mixture consisting of loam two parts, peat one part, sharp grit and small broken bricks one part. It is a good pot plant if kept in a moist frame.

PTERIS.—*P. aquilina*, the brakes, or bracken, is one of the best known of all. Plant it out in good loam or peat where it will have room to run, as it is a persistent traveller. Ten years ago I planted a piece not so big as my hand on a bank in my out-door fernery, and now it covers at least ten square yards of ground; at one point in its course it has crossed the gravel walk and come up on the other side. It makes a good pot plant, and also a good wall plant if planted at the foot of a shady wall and kept up by means of horizontally placed lengths of tarred string or copper wire. These supports should be placed about a foot apart; they will not be visible, and the effect will be a wall richly fringed as with climbing ferns. To see the bracken as it should be seen, we must go to the breezy moorland and skirt the warm woodside; it is, perhaps, the most truly rustic plant in Britain.

SCOLOPENDRIUM.—*S. vulgare* is the common harts-tongue, one of the very first requisites of the hardy fernery. This plant will not live in the full sunshine, and it needs a good mellow loamy soil, or tough fibrous peat, with plenty of moisture to attain the growth it should, say a length of two to four feet. It is, however, an accommodating plant, as the fern hunter will soon learn by observation, for it will be found on damp



POLYSTICHUM ANGULARE.



POLYPODIUM PTEGOPTERIS.

banks in shady lanes, on dry stone walls in dusty roads, where there is not much shade for it, and frequently covers an old brick wall as with a felt of small yellowish fronds. When growing between the bricks inside a well, and putting its huge tongues down towards the water, it is a splendid object, and a good companion to the true maidenhair, which will thrive in a similar position. The species and all the varieties make first-rate pot plants.



SCOLOPENDRIUM VULGARE RAMO-MARGINATUM.

The most generally useful of the varieties, and one of the ferns which should be first of all secured by the cultivation, is *crispum*, a grand pot or rockery fern. The following are handsome pot plants, the smallest of them well adapted for cases:—*bimarginato-multifidum*, *cornutum*, *cristatum*, *digitatum*, *glomeratum*, *laceratum*, *macrosorum*, *ramo-marginatum*, *ramosum-majus*, *Wardii*.

TRICHOMANES.—*T. radicans*, the Bristle fern, re-



POLYPODIUM ROBERTIANUM.

quires treatment similar to that of the Tunbridge fern. As the roots are tough and wiry, and spread on the surface, it will be necessary in planting a piece to spread them out on the surface of the stone, and fix them in their places with pegs, or by placing nodules of stone upon them. In due time they will attach themselves, and after that the plant will grow well if taken care of. Small cases appropriated solely to these ferns are intensely interesting. They ought never to be planted in cases with ferns that need ventilation, as nearly all other kinds do. I had a large leaky aquarium. Instead of having it repaired, a hole was bored in the slate bottom, and a sheet of very stout glass was cut to fit the top. A miniature rockery was then formed with coke and cement in one large block, and on this *Hymenophyllum Tunbridgense*, *Trichomanes radicans*, and the New Zealand filmy fern *Todea pellucida* were planted. They have thriven and have a rich luxurious appearance. The leaky aquarium has thus become a grand fern case.

In a damp stone or a very damp warm dark corner of a greenhouse, the filmy ferns grow freely if their rhizomes are merely fixed to the walls. They soon run up the bricks, and form a delicate felt or living wall-paper.

WOODSIA.—*W. alpina*, an Alpine Woodsia, is a pretty little fern, requiring frame or house culture.

W. ilvensis is a beautiful pot plant. It may, however, be grown in the open fernery, if in a sheltered well-drained position, in a sandy peat soil. The Woodsias are not adapted for beginners.



WOODSIA HYPERBOREA.

CHAPTER XII.

CULTIVATION OF GREENHOUSE AND STOVE FERNS.

PRACTICALLY the only difference in the management of the ferns of the greenhouse and the stove from those of the frame or cool fern-house consists in the increase of temperature proportioned to the character of the climates in which greenhouse and stove ferns are found growing wild. Various as are the climates and conditions in which ferns thrive on different parts of the earth's surface, they all become amenable to conditions nearly uniform when subjected to cultivation. Give the most delicate fern of the tropics treatment similar to what is advised for our native ferns, but with a higher temperature at every season of the year, and the chances are full ten to one that it will succeed perfectly. But undoubtedly it requires some judgment to assimilate conditions in the midst of which there occurs this important difference of temperature, and so we cannot expect to dispose of the subject of this chapter in any offhand or very general manner. However, we must beg the reader to recall the main points of our advice to this extent, that for outdoor, for frame, and for cool-house ferns, we have constantly recommended the use of a granular and

mellow, loamy or peaty soil, a considerable degree of atmospheric humidity, shade from strong sunshine, and, in some cases, a very subdued daylight, as the conditions under which success is most likely to be secured. These several requisites are to be considered of the utmost importance in the cultivation of tender ferns, and the more so that the farther plants of any kind are removed from the circumstances natural to them, the more anxious should the cultivator be to provide for all their wants.

It is a common thing to see ferns and flowering plants mixed together in the same greenhouse or conservatory. It is quite possible to grow them well when so associated, but so few are equal to the task that when we meet with ferns and flowers in the same house, we usually find one or both in a deplorable condition of disease or imperfect development.

Ferns love shade and flowers love sunshine. Ferns thrive best in a still air, flowers usually require a moving atmosphere, and many kinds that are most highly prized need abundant ventilation. As to atmospheric humidity, while ferns with very few exceptions enjoy abundance of it, there are not many kinds of flowers capable of enduring without injury the degree of aerial moisture that would benefit the growth of ferns. These are important considerations which we are bound to place before the reader at this juncture, for indiscriminate associations of plants in stoves and greenhouses are the causes of many and bitter disappointments. While this matter is before us, however, it should be said that if due care be exercised, many

kinds of flowering plants may be grown in the same houses with ferns, if the selection is made judiciously in the first instance, and the best positions as to air, light, &c., are selected for them. Thus, as to sorts it will be found that camellias, azaleas, cyclamens, primulas, liliums, oleas, and statices, are well adapted to associate with greenhouse ferns, if the sunniest positions are assigned them; on the other hand, heaths, pelargoniums, echeverias, epiphyllums, boronias, epacris, and kalosanthes, are far less suitable, needing more air and sunshine than most ferns could endure without injury. It must be remembered, however, that many beautiful plants, such as palms, for example, may be grown with ferns to afford variety, and the same routine of treatment will suit both. In the stove it is common enough to find achimenes, gloxinias, alocascias, caladiums, begonias, gesneras, and marantas, associated with ferns without the least injury to either. Yet in the full blaze of sunshine, where a croton or an ixora would thrive, it would be almost impossible for a fern to live, except in the form of a disgrace to its possessor. So far we see that compromises are possible. There is yet another mode of associating ferns and flowering plants in the same house, and that is to make banks and rockeries beneath the stages where shade and humidity will favour the growth of ferns, and render positions otherwise useless and unsightly as attractive nearly as the stages themselves, on which the amaryllids or the pelargoniums are blooming bravely. A bank of peat faced with large burrs answers admirably for a fernery of this sort, and the varieties of cypripediums,

woodsia, scolopendrium, and selaginella, are pretty sure to take to it readily, while in the most select spots, hymenophyllums, trichomanes, todeas, and maidenhairs, will soon become established, and acquire a luxuriance of growth without the least care, such as to make a mere mockery of all our closed cases and bell-glasses, and curious caves constructed expressly for the cultivation of these gems of the fern garden.

There cannot be a doubt that the plan recommended in Chapter VII for the cultivation of hardy ferns under glass is the best also for greenhouse and stove ferns, unless it be the desire of the cultivator to have the whole or a part of the collection in pots, in which case, of course, something in the nature of a stage or table becomes necessary. A spacious fernery adapted for ferns of all climates, and for the display of them under circumstances which we may justly describe as *natural*, forms one of the most valuable embellishments a garden can boast—enjoyable at all seasons, and especially so in winter, when rough weather forbids our seeking open-air enjoyments, and when, perhaps, if weather permitted, we should find but little in the garden or the field to interest us. One of the best structures of the kind I am acquainted with is in the garden of Alfred Smee, Esq., Carshalton. The walls are formed of solid banks of peat, which extend on either side of the plate on which the rafters rest, so as to form borders within and without. The house may be about eighty feet in length, the banks on either side are varied in outline, and there is in one spot a basin tenanted with gold fish, and surrounded with ferns of peculiarly novel aspect,

which are constantly bedewed by the spray from a fountain. The roof is a span running east and west; the south side of it is covered with felt, and the north side with glass, a plan which admits abundance of light, and renders shading wholly unnecessary. The whole structure is placed on a slope, the lower part being considerably below the outside ground level. At this lowest part is placed the furnace, and there is an extra service of pipes there to maintain a stove temperature. In the middle of the house there are fewer pipes, and a greenhouse temperature is kept. At the upper end the pipes suffice only to keep frost out. Thus in one house the ferns of tropical, temperate, and frigid zones are all accommodated, and though the whole structure is rough, and has been constructed on the most economical principles, the interior presents at all seasons a grand spectacle, and affords a most delightful promenade.

Although, as explained above, ferns and flowering plants may be grown together, those who would do justice to the former must appropriate a house to them exclusively. It is possible to adapt a south aspect to the purpose, but it is not advisable to encounter such a difficulty. A north or north-west aspect is the best. The house should have a roof of not very steep pitch, a sufficient service of hot-water pipes, and ventilators near the pipes to afford warmth to the fresh air as it enters, and others in the roof at each end, but none elsewhere unless the house is a large one. A frequent change of air is essential to the health of the ferns, but we do not want a rushing wind or so much ventilation

as to render the air of the house so dry that the fronds will lose their freshness and health.

Thousands of villas are now furnished with what are called "conservatories," which would answer admirably for ferneries where they happen not to be exposed to burning sunshine all the summer long. The sunniest of these little glass annexes answer admirably for grape vines and succulent plants, such as cactuses and echeverias; the shady ones would answer admirably for ferns, whether in pots or planted out in miniature rockeries.

In the management of greenhouse and stove ferns the most important matter is to secure a suitable temperature for each department or group of plants. The greenhouse kinds require a temperature of 40° to 50° all the winter, but from the middle of April until the middle of October artificial heat may be dispensed with altogether, unless the weather is exceptionally cold; and stove ferns require a temperature ranging from 60° in winter to 90° in summer.

In every case the amount of moisture must be proportioned to the temperature, the more heat the more water, both above and below. When the plants are growing freely the syringe should be used to produce a fine shower over them once or twice a day, and water should be sprinkled on the floor to cause an abundant evaporation. They will also require plentiful supplies of water at the roots.

There is no large class of plants in cultivation for which we may so safely give general cultural directions as for ferns, yet certain kinds require exceptional treat-

ment both in heated houses as in cool ferneries and the open air. The gold and silver ferns, such as gymno-grammas, are for the most part highly susceptible of injury through excess of water, especially when administered by means of the syringe. All the tree ferns such as Dicksonias require abundant supplies of water, especially over their ample fronds. Most of the kinds which have thick succulent leaves, such as Nipholobolus, require drier positions if planted out, and extra careful drainage if in pots, than others that are of flimsy texture.

The cultivator must be careful to regulate heat and moisture in such a manner as to ensure to the plants regularly recurring seasons of activity and rest. When new growth commences in spring there should be a gradual augmentation of temperature and humidity to afford needful stimulus and support. When in autumn growth should naturally cease, the supplies of heat and moisture should be diminished; and during the winter rest should be promoted by keeping the house as cool and dry as is consistent with safety. It is bad policy to expose ferns to hardships, such as deferring the lighting of a fire until the fronds are actually frozen or mildew has marred their beauty, for the next season's growth is jeopardised by such treatment, and some valuable plants may be lost entirely. At the same time the cultivator may take comfortable assurance from the fact that the majority of this class of plants are exceedingly accommodating; they will at times bear without material injury more damp, more draught, more sunshine, and lower degrees of temperature than a prudent

adviser on their cultivation would dare to recommend as good for them. Fully half of the whole number of stove ferns known to cultivators have been well grown in greenhouse temperature, and a very large proportion of greenhouse ferns, properly so called, have been grown to perfection, without any aid from artificial heat, in our own garden. Our large specimens of *Adiantum cuneatum*, *Asplenium biformis*, *Blechnum brasiliense*, &c. &c., that we have exhibited in public, have never known a taste of artificial heat from the time when they started from spores under bell-glasses until they attained their present dimensions of a yard or so across. This adaptability is particularly exemplified in the cultivation of ferns in closed cases, Mrs. Hibberd's cases containing delicate ferns of the tropics side by side with the natives of the British woods, yet all in the most perfect health and beauty.

The soil for pot ferns should always consist in great part of vegetable mould and sand; mellow loam, silky to the touch and crumbling to powder between the fingers without soiling them; peat of a brownish rather than a blackish cast, and containing an abundance of vegetable fibre, so as rather to require tearing than crumbling to reduce it; sand of a sharp clean nature: these three ingredients are sufficient for the preparation of a universal fern compost. In the case of very small delicate habited ferns use two parts peat, removing all the rougher portions, and one third sand. For full growing and rather large plants use two parts peat, one part loam, and one part sand, the rougher fibrous portions to be laid over the crocks, and the

bulk to be used in a rather lumpy state. For very robust habited sorts of large growth the compost should consist of two parts loam, one part peat, and one of sand, with a liberal addition all through of broken brick or tile of the size of walnuts or hazel-nuts. Ferns that require a drier soil than ordinary should have a compost containing more sand, less loam, and the addition of a considerable proportion of pounded bricks or charcoal.

No particular kind of pots is necessary for the cultivation of stove and greenhouse ferns, but, as a rule, they do not root deeply, and shallow pots are to be preferred. Those we use for specimens are made for us by Messrs. Adams, of the Potteries, Belle Isle, King's Cross; they are extra stout in substance, carefully finished, and well burnt, and in proportions wider than their depth. A favorite size with us for medium specimens is thirteen inches wide (inside), and nine inches deep. In these we allow our specimens to remain two or three, and even four or five years, without being repotted, though, as a rule, all pot ferns should be repotted annually in February or March, both to repair the defects of the drainage and remove effete soil, and supply fresh food for maintaining a vigorous growth.

In every case thorough drainage is of the utmost importance, and no progress can be made in fern culture unless the operator pays especial attention to this matter. As for whatever else may be requisite to crown your labours with success, I will endeavour in what follows to indicate as clearly as I can, but it is very certain I shall leave unsaid much that might be

said, but I may, even thus far, have assisted you to read the Book of Nature to advantage, so that at the point where I stop your studies will take a better direction under authority which never fails.

“ Our needful knowledge, like our needful food,
Unhedg’d lies open in life’s common field.”



ADIANTUM FARLEYENSE.

CHAPTER XIII.

FIFTY SELECT GREENHOUSE FERNS.



THE selections I shall make in this and the next chapter will comprise ferns of the most distinct and various characters, essential in any collection in which beauty and character are the qualities most desired, and all of them suitable for beginners in cultivation. None of the gold and silver ferns will be included in these selections; they will be dealt with separately, as needing more skill and care than beginners are likely to bestow upon them. Technical descriptions are not to be thought of in a work of this kind.

Anemidictyon phyllitidis, a pretty flowering fern, adapted for pot culture, or to plant out, or for the fern case.

Adiantum assimile, *A. cuneatum*, *A. formosum*, *A. fulvum*, *A. tinctum*, a charming group, requiring shade, not rooting deep, and better if they never have water over their fronds. They are all adapted for specimen culture, the last is one of the most elegant in form and has a rosy purplish tint on its young fronds.

Asplenium bulbiferum, *A. caudatum*, *A. dimidiatum*, *A. dimorphum*, *A. hemionitis* (or *palmata*), *A. lucidum*,



ADIANTUM CUNEATUM.

A. obtusatum, *A. præmorsum*. The two most striking of this group are hemionitis and dimorphum, which should be first secured. As to management, the merest beginner can grow them well.

Blechnum occidentale, *B. brasiliense*, two noble ferns, suitable for the greenhouse, yet rather tender, and utterly incapable of bearing a touch of frost.

Campyloneurum phyllitidis, a very distinct entire fronded fern, which forms a striking object when well grown. It is commonly kept in the stove, but the greenhouse is the proper place for it. The soil for this fern should be rich and gritty, containing plenty of fibre, but it should not be deep, as it is a shallow rooter. Abundance of water should be given while the plant is growing. It is not particular whether in sun or shade, but, of course, will not bear roasting.

Davallia canariense, the "Hare's-foot" fern, *D. dissecta*, a charming pair, and the easiest of the family to grow. It is easy to kill Davallias by means of heavy soil and excess of water; equally easy to grow them to perfection with plenty of drainage, a very gritty soil, and water in moderation. The fleshy rhizomes must be pegged out upon the surface in planting new pieces.

Gleichenia flabellata is the only one of the genus I can recommend to a beginner. It is a fern of large growth, requiring to be carefully trained like a delicate climbing plant. Plant in a shallow pot, give plenty of water and plenty of air. When you have mastered this one add *G. dicarpa* and *G. speluncæ*.

Goniophlebium appendiculatum, a splendid edition (we



CAMPYLONEURUM PHYLLITIDIS.

may call it) of our own common polypody; when young tinted with crimson. It requires a rather dry



DAVALLIA CANARIENSIS.—THE HARE'S-FOOT FERN.

soil; so add extra sand and a good sprinkling of fine

potsherds to the compost. Do not wet the fronds at all.

Hypolepis tenuifolia, a finely divided brightly coloured fern, requiring abundance of water.

Litobrochia incisa, rather coarse, but worth having; it will take care of itself almost anywhere.

Lastrea quinqangularis, *L. patens*, two exquisite gems, cheap, but not common. They thrive in our cool fernery.

Lomaria magellanica, *L. gibba*, *L. chiliense*, grand ferns, nearly hardy, and indispensable in even the smallest collection. *L. gibba* will endure almost any hardship except frost.

Lygodium Japonicum, *L. scandens*, the two best "climbing ferns" for a beginner. They may be trained to sticks or wires in the same way as a convolvulus.

Mohria thurifraga, a rich fern, good enough for exhibition. It thrives in the cool fernery, but is rather tender.

Nephrodium molle corymbiferum, a charming tasselled fern, like a cocksecomb; rather tender, and therefore pretty sure to be lost if kept damp and cool in winter; yet it is a greenhouse fern, and one of the best.

Niphobolus lingua, *N. rupestris*, pretty entire-fronded ferns, requiring a dry soil, with plenty of broken brick and sand. Well adapted also for the fern case. For several years past we have grown a collection of ferns of this class in a sunny part of the geranium house, and the full blaze of the sun has agreed with them perfectly. Any excess of moisture will kill them.

Nephrolepis tuberosa is the only one of this splendid family I can recommend for the greenhouse, though they are all classed as greenhouse ferns in trade catalogues. This, however, is so distinct, that you must have it if you buy only a dozen.

Onychium Japonicum, a delicate fennel-like fern,



NEPHRODIUM MOLLE, var. CORYMBIFERUM.

fragile, fairy like, yet nearly hardy, and always in health, if thoroughly shaded.

Platyroma rotundifolia, very distinct and fine when in fruit. It must have deep shade.



POLYPODIUM VENOSUM.

Polypodium venosum in the way of *Niphobolus lingua*, a charming object when its ruddy fruits are ripe. This fern requires peculiar treatment, and if properly planted in the first instance will occasion no trouble whatever. In any case the roots must be extra well drained, for stagnant moisture is certain death to this plant. The soil which suits it best is a mixture of equal parts gritty leaf-mould, sandy peat, and potsherds broken to the size of peas. In such a mixture, not more than six inches in depth (four inches is sufficient), on a bottom of some material which will allow of ready escape for surplus moisture, the plant will do well, and prove itself an almost hardy fern. Obviously the best way to deal with a plant so constituted is to suspend it. When grown in a basket in a warm greenhouse it soon forms a fine specimen, the tawny rhizome creeps about wildly, and soon covers the basket with a beautiful complexity of cord-like windings, and from every part of it, except the young pushing shoots of the season, barren and fertile fronds are produced in plenty. To increase it is easy enough; cut off a portion of rhizome with fronds and roots attached; pot it in the same sort of mixture as is recommended for specimen plants, and give it proper encouragement, and it will soon make a plant.

Phlebodium aureum, *P. sporodocarpum*, two bold glaucous tinted ferns, with ruddy rhizomes that run upon the surface. They are both classed as stove ferns in the books, but they are as easy to grow in a greenhouse as any in this list; at all events we can keep them in luxuriant condition in the cool house. Plenty of grit in the soil, and perfect drainage.

Polystichum setosum, a lovely dark green fern, will take care of itself anywhere in the shade.

Pteris ternifolia, *P. hastata*, *P. cretia albo lineata*, *P. scaberula*, *P. flabellata*, a fine group; *scaberula* runs about, and should not be put into a case for that reason; but in a basket, which will allow it to peep out, it is at home; as for the last in the list it is lovely, and thrives in our cool house.

Platynerium alcicorne is absolutely indispensable for its curious habit and its hardiness. It will bear seven or even ten degrees of frost, and yet come right again, but should never be so much punished. Get a block of old wood, scoop out a hole, and put in it some fine peat, and in that hole fix the plant firmly. Then hang up the block by means of copper wire, and syringe frequently all the year round. It will in time cover the block with its tawny shields (we call them "pot lids"), and make a grand object. A plant has hung near the roof of our cool house for ten years, and has several times been frozen.

Todea pellucida and *T. superba* are a pair of New Zealand filmy ferns of the most exquisite character. I am half afraid to recommend them to beginners, yet they only want deep shade and moisture to succeed to perfection, as they are nearly hardy. Plenty of drainage, plenty of patience, as little air as possible, and all will be well. I have some fine plants growing in a disused (because leaky) aquarium; they are in fine condition. They are covered close with a sheet of glass and never have any air at all.

Thamnopteris australasica is too good to be omitted.



PTERIS SCABERULA.

You may call it a sublime hartstongue. It loves warmth, and thrives in the stove. A little practice, however, will suffice for its management in a warm greenhouse. Mr. Gibson had the daring to make a bed of a few dozens of this fern in a shady spot in Battersea Park in the summer of 1867, and not one of them suffered by exposure to the vulgar atmosphere of this degenerate clime.

Woodwardia radicans, *W. orientalis*, grand large growing ferns that will bear many hardships, and yet live. The first is indispensable to a beginner who can find room for it, and as to growing it, look at it now and then, and it will be satisfied; the other is of smaller growth, and scarcely less hardy; it has a purplish tint when growing. Both produce young plants in abundance on their mature fronds.

EXHIBITION GREENHOUSE FERNS.—The following form a rich and varied group of twelve adapted for exhibition: *Lomaria gibba*, *Blechnum brasiliense*, *Asplenium dimorphum*, *Asplenium hemionitis* (also known as *Asplenium palmatum*), *Phlebodium sporodocarpum*, *Pteris cretica albo-lineata*, *Gleichenia flabellata*, *Microlepia platyphylla*, *Nephrolepis exaltata*, *Thamnopteris australasica*, *Woodwardia radicans*, *Pteris flabellata* var. *crispa*.



CHAPTER XIV.

THIRTY SELECT STOVE FERNS.



NEIMIA collina, a fine representative of an interesting group of flowering ferns. It requires the most commonplace treatment.

Adiantopsis radiata, a very distinct and elegant little fern; the divisions of the fronds radiate in a regular manner from a common centre.

Adiantum concinnum, *A. Farleyense*, *A. macrophyllum*, *A. tenerum*, *A. trapeziforme*; a splendid group, not one of which can be dispensed with in even the smallest collection. *A. Farleyense* might in an offhand way be pronounced the most beautiful fern known, but the assertion would not bear criticism, just because there are so many beauties of the kind; it is impossible to decide which is the best amongst them.

Asplenium formosum, *A. serra*, *A. viviparum*. The second of these is a large-growing exhibition fern; the other two are delicate beauties.

Blechnum brasiliense, a noble fern, well adapted for exhibition, and one of the easiest to manage.

Brainea insignis, a grand fern, palm-like in growth, the young fronds tinged with a lovely rosy hue.

Davallia polyantha, *D. aculeata*. The fronds of the

first have a rich rosy crimson tinge when young; the



DAVALLIA ACULEATA.

other is as thorny as a bramble, and grows in the style of a climbing fern.



POLYPODIUM LACHNOPodium.

Elaphoglossum frigidum, a curious and most beautiful species, with entire wavy, pendant fronds, which are covered with grey scales, giving it a hoary appearance. Nothing in its way can surpass it.

Gleichenia pubescens, one of the finest and easiest stove plants of this section. Deserves all the care that can be given it to form a fine specimen.

Goniophlebium fraxinifolium, a particularly handsome once divided fern, of a delicate pale green colour.

Goniopteris crenata, extremely pretty when in fruit, and well worth growing as a specimen.

Hymenodium crinitum, most distinct and beautiful; not in the least resembling any other fern known; the fronds are like the large leaves of some tropical tree, densely bearded with black hairs.

Hemionitis palmata, a distinct ivy-like fern, bearing many tiny young plants on its fronds.

Lomaria attenuata, a very pretty little blechnum-like fern, the young fronds of which have a delicate rosy hue.

Lygodium flexuosum, the grandest of the climbing ferns; scarce.

Nephrodium glandulosum, extremely pretty and peculiar; the fronds once divided; shining green.

Nephrolepis exaltata, *N. pectinata*, the two best table and sideboard ferns known, and first rate, too, for the centre of a fine vase or large case group. We have lost many fine plants of both species in the endeavour to make greenhouse ferns of them.

Polypodium lachnopus, *P. Henchmanni*, *P. phymatodes*, three fine and very distinct species; the metallic blue colour of the second is peculiar and pleasing.



CHEILANTHES ARGENTA.



POLYPODIUM HENCHMANNII.



POLYPODIUM PHYMATODES.

Pleopeltis membranacea, a scarcely interesting fern at first, but one likely to become a special pet in time. It dies down completely in winter, and comes up again in the spring. The fronds are undivided, and bear a remote resemblance to lettuce leaves. We have had some plants five or six years in an unheated case, but it is delicate, and most at home in the stove.

Pteris argyrea, *P. aspericaulis*, two richly variegated ferns, which are very subject to attacks of thrips if kept in a dry air. *P. tricolor* is a favourite which I do not recommend because troublesome to grow, and scarcely worth growing.


Platycerium grande is the finest of the stag's horn ferns, and though usually described as a greenhouse plant, attains a far finer development in the stove. Fix it on a block of wood, and suspend it, or put a block in a pot, and place the plant near it, so that it can take hold and cover the block in its own way.

EXHIBITION STOVE FERNS.—The following form a rich and varied group of twelve adapted for exhibition: *Adiantum Farleyense*, *Adiantum trapeziforme*, *Hymenodium crinitum*, *Aspidium macrophyllum* (also known as *Cardiochlæna macrophylla*), *Asplenium myriophyllum* (also known as *Asplenium cicutarium*), *Asplenium serra*, *Drynaria morbillosa*, *Gleichenia dichotoma*, *Lygodium flexuosum*, *Nephrolepis davallioides*, *Platycerium grande*, and *Pteris argyrea*.



CHAPTER XV.

GOLD AND SILVER FERNS.

 ONE of the so-called gold and silver ferns are adapted for beginners. They are so superbly beautiful that people altogether unaccustomed to ferns buy them and put them in greenhouses, supposing that watering now and then is all the care they want, and in the course of a month or so the plants die, and an absurd inference is drawn from the occurrence that ferns in general are impossible things. It is quite certain that a very large number of maidenhair ferns are killed by ladies who pretend to love ferns and really have no real care for them at all; but probably there are more gymnogrammas killed through absurd treatment than any other class of ferns whatever. Yet they require but little more care than most others; their peculiarity is that if that care is denied them they die outright; whereas many other kinds survive neglect and ill-treatment, and regain their cheerful looks "in no time" if proper treatment is resorted to.

If we could repeat in an intensified form all the cautions that have been given in this work up to this point we should have a practical code for the cultivation of gold and silver ferns. Instead of attempting that, I

will sketch out a code in a very few words, begging the reader to regard each word as pregnant with meaning, each hint and direction as involving for the ferns issues of life or death, as they may be observed, trifled with, or ignored. The pots must never be larger than the plants can soon fill with roots. They must be very carefully drained by means of potsherds packed with the greatest care. The soil should consist of good fibrous peat and a large proportion of sharp siliceous grit; silver sand is almost too fine, but must be used if nothing more granular is obtainable. The plants must be potted firmly with the crowns well above the surface. Thenceforward the temperature and the degree of humidity are of the utmost importance. Only a small proportion of all the gold and silver ferns in cultivation require the heat of the stove, but not one of them will endure a lower temperature than that of the house it properly belongs to. Thus, there are many stove ferns that thrive in a greenhouse, and many greenhouse kinds that do well in an unheated house. But it is not so with those before us; they are not accommodating, they are exacting, and must be humoured to their whim. As to moisture none of them will bear much; to make them very wet is to put them in jeopardy. But on the other hand to let them go dry is certain death. The principal enemies that make war against them as cultivated plants are imperfect drainage, heavy soil, cold, damp, and drought. In no case should the fronds be wetted by the use of the syringe. The little that I have said compasses the whole subject, and the observant cultivator, who is also diligent and con-

stant in his work, will find that the secret of success with this class of ferns is *unremitting attention*.

The following are the names of the best gold and silver ferns in cultivation :

Adiantum sulphureum, the Golden Maidenhair. This exquisite plant only needs careful greenhouse treatment.

Cheilanthes argentea, a delicate silver fern ; greenhouse. *C. borsigiana*, golden ; stove. *C. farinosa*, silver ; a fine species very distinct, requiring great care ; stove. *C. fragrans*, a lovely little gem tinged with orange, well adapted for greenhouse or case. When dried agreeably fragrant. *C. elegans*, silvery, a most delicate and much prized fern, best grown in a warm greenhouse, in a compost of lumpy peat and broken bricks or stone. *C. pulveracea*, the under side silvery, the edges golden : a fine companion to *C. farinosa*, and needing the same treatment.

Gymnogramma chrysophylla, the finest of all gold ferns ; it must be grown in the stove. *G. Peruviana argyrophylla*, silvery-grey on both surfaces, a splendid stove fern. *G. ochracea*, slightly golden, easy to grow, but needing to be kept in the stove all winter. *G. sulphurea*, a pretty little plant, light green above, sulphur-yellow beneath ; must have stove treatment. *G. Tartarea*, the under side of the fronds pure silvery-white, the best of all silver ferns for beginners ; it thrives in the stove, but may be kept in good condition in a greenhouse.

Nothochlæna argentea, a fine silvery companion to *Cheilanthes farinosa*, and requiring similar care. *N. flavens*, an exquisitely beautiful miniature golden fern ;


a good companion for *N. nivea*, which is equally diminutive and densely powdered with silvery farina.



GONIOPTERIS CRENATA.

CHAPTER XVI.

TREE FERNS.

REE ferns have been brought within the reach of fern growers who happen not to be millionaires, by the enterprise of trade collectors, and may be purchased according to size, rarity, &c., at from five guineas each and onwards. Those, however, who would like to grow their own, and who are blest with the needful patience, may obtain young plants to begin with at from five to fifty shillings each. There is much to be said in favour of purchasing young plants; they are extremely ornamental, and the greenhouse kinds will thrive in the shady parts of a conservatory where scarcely anything else would grow. If it is intended to embark in the purchase of fine specimen tree ferns it will be important to consider first the space available, for the spread of a fine *Dicksonia* or *Cyathea* is considerable, and it is not good for them to rub their fronds against the glass roof, however carefully it may be shaded.

There are no species of filices more easy to cultivate than such as are classed as "tree ferns." The soil should be the best peat in a rough state, with but little sand added; the addition, however, of sphagnum moss

or cocoa-nut fibre improves the peat for the purpose. Large pots or tubs are needful; the roots will bear a certain amount of cramping, but as a free growth is desirable—in fact essential—both to maintain the health besides developing the beauty of the plants, as much pot room must be allowed as possible, consistent with the sizes of the plants and the place they are kept in. Shade is of the first importance, abundance of moisture is indispensable.

The most desirable greenhouse tree ferns are *Dicksonia antarctica*, *D. squarrosa*, *Alsophila australis*, *A. excelsa*, *Cyathea dealbata*. The first named is the most useful and is extremely likely to prove a hardy plant for sheltered shady dells in the south-western parts of England and the warmer parts of Ireland. The beginner should avoid *Alsophila capensis* as risky, and the expert need be in no hurry to obtain it.

The most desirable tree ferns for the stove are *Alsophila glauca*, *A. armata*, *Cibotium scheidei*, *Cyathea arborea*, *C. microlepis*.

Let us now suppose that some obliging friend in Australia makes you a present of a lot of tree ferns. He has found some specimens with stems from four to five, or even six feet long; he has cut away all the fronds, and dug them up, without taking the trouble of saving any of the roots. In fact, they are stems and nothing more—stems, sans fronds, sans roots, sans everything. He leaves them out in the air for a few days to dry, and then packs them with shavings in a box; let him be especially careful that this box be not air-tight—that is their greatest danger. In this way


they generally come with pretty good success, a large majority of them quite safely. And now, as we unpack them, let them be placed upright in some close, cool, dark corner—under the stage of a greenhouse is as good a place as they can have. Give them a syringing once a day for the first week, and after that two or three times a day; never allow them to get quite dry. By the end of a fortnight, or even sooner, you will observe the points of new roots starting out upon the stem, and the closely coiled-up fronds in the centre to be pushing upwards.

They may now be safely potted. I have no faith in *exact proportions* for mixing soils, and my candid opinion is that the mechanical condition of the soil has more influence than anything else. Let it then, above all things, be open and porous. Use pots as small as you can in the first place, and shift them from time to time as the plants may require it, using rough peaty soil as before. If allowed to become pot-bound, the fronds soon dwindle in size. Keep them always moist at the root, and during nine months of the year the stem should be kept constantly moist. This can easily be done without wetting the fronds much, which is not always beneficial. Do not expose your plants to draughts of dry air, and be sure to shade them from bright sunshine. Following these simple rules, your tree-ferns will be an ever-increasing source of pleasure.

CHAPTER XVII.

FERN ALLIES.

LYCOPODIUMS, SELAGINELLAS, PEPPER-WORTS, HORSE-
TAILS, AND MOSSES.

OWEVER slightly the cultivator of ferns may be interested in their technical classification and botanical affinities, it is impossible to proceed far in the practice without being attracted by the beauties of certain plants which are not ferns, but cousins-german to them. A tuft of club moss in a marsh or of horsetail in a damp and tangled hedgerow will arrest attention, and the beginner may ask the question—"Is this a fern?" and when assured that it is not one, will probably ask again, "What is it?" In the greenhouse and the stove the moss-like selaginellas, usually called lycopodiums, associate with ferns as their proper companions, requiring similar treatment and being obviously allied in structure and habits. On this border land there is entertainment for the curious; a knowledge of the distinctive character of the tribes of plants that haunt it will prove, like many other kinds of knowledge, abundantly remunerative to those who will earnestly seek it, and the lover of vegetable beauty, who may be indisposed to pore over books or labour with the microscope will discover here many gratifications.

The true ferns may be traced through many gradations of physiological structure with comparatively little trouble. At all events when the botanists have classified them, it needs no subtlety of perception to determine that the adder's tongue and moonwort ferns are the lowest in the scale, and that their very existence is suggestive of a gradation of similar forms laterally or vertically separated from them to which these least fern-like ferns serve as connecting links. The plants that are closest allied to the ferns are the Lycopodiums, the Selaginellas, the Pepperworts, the Horsetails, and the Mosses. After these we get amongst lichens and fungi, and as we must stop somewhere, the foregoing five families are all we shall recognise for the purposes of this chapter. Each family contributes beautiful plants adapted for the fern garden, and as for the selaginellas they are all beautiful, and we make selections from amongst them, because usually we cannot find room for the fifty or more species and varieties known to cultivators.

Lycopodiums and Selaginellas closely resemble mosses in their branches and leaves, while in many of their general characters and aspects they bear close resemblances to ferns. They are, however, distinct from either, and are especially characterised by the nature of their leaves and their fructification. There is one broad distinction between lycopodiums and selaginellas, which the beginner may bear in mind with advantage. Lycopodiums have imbricated *leaves all of the same shape* spirally arranged. Selaginellas have *leaves of two sizes and slightly differing in form*. You

will not readily perceive these distinctions, but look at a fresh branch of *Selaginella* with the aid of a lens, and you will see that between the evident leaves which stand right and left there are smaller tooth-like leaves arranged in the manner of bracts; such leaves as these you will never find in a true lycopodium. The distinctions that depend upon fructification are more subtle, and to describe them would render these pages wearisome. Better is it to quit this part of the subject at once and consider the several families named above as subjects for cultivation.

LYCOPODIUMS.—The British Lycopodiums are scarcely worth cultivating, for the simple reason that the best endeavours have invariably failed. They are not without beauty; indeed, when we meet with a large patch of *L. clavatum*, forming a green mat two or three yards over on a tract of heath, we are compelled to admire, and can scarcely fail to be tempted by the wish to grow the plant to a similar state of perfection in our own gardens. So, again, *L. annotinum*, the most distinct of all; and *L. alpinum*, a charming evergreen tuft that may be mistaken for a savin, are well worthy of further attempts at their domestication. I must confess that I have tried them all and failed with all except *L. inundatum*, which I have had no trouble with, for it grows freely with me in the simple way I manage it, which is to bring home with me some of the soil from the bog I find the plant growing in, and having potted it in this, I keep the pot always standing in a pan of water. Plenty of fresh air it must have, or it will not last.

L. selago, the Fir-club moss, is a noble species, quite common on stony mountain tracts, a plant of great interest too on account of its medicinal properties. In the open fernery, probably, all our British species would thrive if taken up in large masses and planted in fully exposed positions in soil specially prepared to resemble that of their original sites. With them should be associated an American species, *L. lucidulum*, which closely resembles our *L. selago*, but is of a shining dark-green colour. This thrives in peat soil in the open fernery if favoured with shade and moisture.

SELAGINELLAS.—Amongst these occur so many lovely forms of vegetation, that we can safely say for the guidance of the cultivator, the larger the collection the better. The delicate cushion-like growth of *S. apoda*, scarcely to be equalled by any of the true mosses, is unique for beauty. It will suggest to the reader of Milton the description of the home life of the matchless pair in the happy garden—

“Of grassy turf their table was,
And mossy seats had round.”

The metallic blue of *S. lævigata* (*S. cæsium*) is positively marvellous, yet the plant is common and will grow in any moist warm close spot, scarcely needing warmth or daylight, though growing the better for a little of both. In *S. rubricaulis* we have the colours of the red coral and the emerald combined; in *S. formosa* we have a charming semblance to a fern, yet a kind of beauty which no fern possesses.

In practice we find them all adaptable to cool houses

and unheated cases, but to grow them in perfection warmth is essential, and they may all be treated as stove plants, and wherever there is a suitable place for them, so surely ought this class of plants to be strongly represented, for they are quite at home, and thrive where it would be next to impossible to keep any other plant in a healthy growing state, even if it could be persuaded to drag out an existence, which would not be at all likely to compliment the cultivator for the skill and trouble expended upon it. It greatly enhances the attractions of the fern house to distribute the selaginellas amongst large specimen plants, where they can have the advantage of the shade from them, putting them, of course, so as they can be readily seen, for it is no use to put a light under a bushel. They are also well suited to stand amongst strong-growing ferns, for the spreading nature of the fronds of the ferns prevents the pots being set close to each other, thus giving ample room to stand dwarf-growing plants, which require similar treatment and a deeper intensity of shade than the ferns. They will, however, grow well in a house with a suitable temperature if there are no other plants of any description but them in it, provided that the house is properly shaded. My reason for suggesting the suitability of these plants for growing between others of larger size is this—the stove is generally of limited extent, so that every inch of space is required to be made available for growing something or other, and there is always space between large specimen plants, although their fronds may meet overhead, suitable for growing dwarf plants like these,

thus leaving the other space, which has the advantage of the full light, available for growing other subjects.

The best mode of growing fine specimens is in pans, for they are shallow rooting plants, and do not require a great depth of soil. By adopting pans we are enabled to give them a much larger space to spread over than would be practicable in pots. Pans of eighteen inches in diameter are a very convenient size for strong-growing kinds, whilst for the moss-like sorts of dwarf growth a smaller size is far better. The pans should have about an inch of drainage crocks broken rather fine, a layer of rough peat, and then must be filled up with a compost consisting of peat, loam, leaf-mould, and silver sand, equal parts. This should be pressed firm, a layer of sand put over it, and the cuttings laid on and pegged down. The cuttings should be good-sized pieces. I take them off at the base, close to the soil, which is better than the tops, and if they are properly attended to, they will soon take root and cover the pans. It is best to keep them renewed in this way than keep a lot of old plants; for when they are old they are bad, and get broken about, and bear no comparison to young healthy plants. The metallic lined *lævigata* can be kept in good trim by cutting it down to the pan when it becomes a bad colour, and if it has a little fine soil and sand, or sand alone sprinkled over it, and set in a warm corner, it will soon recover. Unless kept in deep shade this charming plant soon loses its exquisite colour.

Kinds which have *inæquifolia* and *viticulosa* for their type require a slightly different method of treatment in

their propagation. Instead of laying the pieces on the top of the soil, the old plant should be taken out of the pan, divided into small pieces, and dibbed a few inches apart in fresh soil, in pans about nine inches in diameter, and as they cover the pans be shifted into larger sizes according to their requirements; they are slower growing than the others, and do not make large plants so quickly. Any time of the year will do for the propagation, but autumn is the best; for during the winter the cuttings get rooted if kept warm enough, and with the return of spring grow freely and soon make handsome tufts. All the kinds which are of moss-like growth, and form rootlets on their stems, are adapted to cover rocky surfaces in the fern house. Just sprinkle a little sand or peat on the rock or brick, and upon this prepared surface press a few pieces of *denticulata*, *apoda*, *densa*, *obtusa*, and others of like habit, give a sprinkle daily with the syringe, and they will soon take hold and spread and form charming little carpets of the most delicate vegetation. Specimen plants in pans will need frequent syringing when growing vigorously, but as the damp days of autumn approach, syringing must be practised less, and during winter must be discontinued altogether.

As there are few cultivators who can find room for all the Selaginellas, a selection of the most distinct and beautiful will be useful.

GREENHOUSE SELAGINELLAS.—*S. stolonifera*, green and tree-like. *S. formosa*, green, tree-like, massive. *S. microphylla*, green, slender, tree-like, red-stemmed. *S. uncinata*, blue, prostrate, wiry. *S. apoda*, green,

moss-like, one of the best. *S. denticulata*, green, well known, one of the most useful. There is a white-tipped variety which makes beautiful tufts in greenhouse or stove. *S. Willdenovi*, green, fern-like, very hardy; one of the best. *S. lepidophylla*, dark green, like a miniature cedar tree. This is the American "Resurrection plant." *S. obtusa*, green, moss-like, beautiful.

STOVE SELAGINELLAS.—*S. rubricaulis*, red-stemmed, tree-like. *S. lævigata*, blue, a splendid climbing plant, well adapted for the fern case or to train as a climber. *S. jamaicensis*, phosphorescent, a delicate little gem.

PEPPER-WORTS.—These plants are known in botany as the *Marsileaceæ*; they are for the most part insignificant and would have no place in this chapter were it not for the peculiar merit of one of the family which many fern-growers would like to possess. This is the *Marsilea macropus*, the Nardoo plant of Australian explorers, the plant mentioned as the last resource against starvation in the tragic story of the Burke and Wills exploring expedition. This species may easily be taken at first sight for a large-leaved oxalis, or trefoil, owing to the peculiar divisions of its leaves. It may be grown with the greatest ease in a pot of spongy peat kept constantly plunged in one or two inches depth of water. *M. quadrifolia*, a native of Germany, is also a pretty species, but it has no story to recommend it like the other.

HORSETAILS OR EQUISETUMS.—There is a rather troublesome weed, of very elegant structure and curious history, met with in undrained clay and loamy soils;

it is of a pale green colour, and consists of a tough and rather decumbent stem, surrounded with whorls of thread-like branches, its true leaves, if it has any, being in the form of minute scales, placed around points or rings which occur at regular intervals on the stems. The plant is known to country people as the "horse-tail" or "mare's-tail," and in botany is called *Equisetum arvense*, the field Equisetum. Though a troublesome weed, and one that is detested where it grows plentifully, it is well worth a place in the fernery, and when planted in a shady bank of peat, it spreads fast, and makes its appearance in all sorts of places, but does not drive better things out of the way, or even render itself objectionable. I have some of it in a shady part of my fernery, and very much enjoy the mixture of its elegant light green spray with such ferns as *Onoclea sensibilis*, and others that have bold-looking fronds. Those who know this plant, as probably most of our readers do, will be, perhaps, prejudiced in favour of the genus to which it belongs. But whether such be the case or not, I wish to recommend these plants to the notice of fern-growers, as suited to contribute in a special manner to the interest of a collection of acrogenous plants. I have all the species that are known, and one of them I consider the most elegant of all plants ever seen upon the face of the earth. This gem is called *Equisetum sylvaticum*, one stem of which is represented in the accompanying figure. If the reader can imagine a nine-inch pot, with about fifty of these stems crowded together in it, all of them arching over with exquisite grace, like feathers from the tails of birds



EQUISETUM SYLVATICUM.

of Paradise, the colour the most tender shade of emerald green, no apology will be needed for calling attention to it in these pages, for it is, in fact, one of the most desirable of plants for the fern garden.

Equisetum sylvaticum is a British plant, very scarce generally, but plentiful enough in some districts. When met with it is usually in a peaty soil, beside a water-course in a shady wood, or on a bank beside a ditch overhung with trees and rank herbage; always in a moist, shady spot, and if not in peat, in some light soil of similar nature. My best plants in pots are kept under a stage, and have all the drip that results from the watering of plants above them, besides the water given them in the usual way, and their appearance is so delightful, they so fascinate me that I never enter the house where they are kept without having a peep at them. They are to me a feast which never satiates, though I sometimes become tired of flowers, especially after I have for weeks constantly been visiting great gardens, and comparing and criticising bedding effects. We have it also planted out in the shadiest and dampest part of a rockery, in a cool fernery, and also in a shady part of the fernery out-of-doors. It increases fast, and may, if desirable, be parted annually in spring when it begins to grow; but to make a fine specimen it should not be parted, but be shifted to a larger and larger pot every year, and this should be done without breaking the ball when the plant is shifted; no, not even the crocks should be removed.

Another grand species is *Equisetum telmateia*, which is of more robust habit than the last, with regular

whorls of branches, which differ from those of *sylvaticum*, that they do not branch again. This grows on dry sandy banks, and is tolerably common, especially in the southern parts of England. It grows finely in the rockery if planted in a shady spot, and though found wild in very dry positions, I have never found it succeed except in a damp position, unless assisted with frequent watering. Sandy peat is the best soil for it.

Another and most beautiful species is *E. umbrosum*. This is very distinct and very rare. The whorls of branches are rather crowded, and they all rise at a regular angle, and gracefully arch over at their ends. This grows in very shady places, and requires the same kind of cultivation.

Equisetum palustre is another exquisitely beautiful plant. By many this will be considered more beautiful than *sylvaticum*, for the slender branches divide and subdivide into the most hair-like ramifications; indeed, it looks as if constructed of hair, but in a manner that would be impossible to human fingers even if only in imitation of its beauty. This grows in bogs, and therefore when under cultivation must have a damp position and plenty of water.

I have also plants of *E. fluviatile*, which grows in water; *E. hyemale*, also a water plant; *E. Mackaii*, which loves moisture, and *E. variegatum*, which will grow well under almost any circumstances. But these four have no beauty. They are like rushes, tall, rigid, without branches, very pretty in a certain sense in their construction, but are likely to interest only such as are devoted to the study of these plants.

MOSSES.—Though we rarely meet with these as special objects of cultivation, a large number of the most beautiful may be grown with but little difficulty in an outdoor fernery, and a few are well adapted for cool house and frame culture. Where ferns are well managed mosses are sure to appear amongst them spontaneously, and add very much to the beauty of the rockery by the tone of age and ripeness they give it. In the 'Floral World' of February, 1869, the writer of this gave his experience at length upon this subject. Those who are particularly interested in it may peruse the article with advantage.

In collecting mosses for cultivation, they should be taken with a thin slice of whatever they may be growing upon adhering to the roots. Thus obtained, they will grow freely, and spread in all directions. But when they are rudely torn from pieces of rock, the roots are injured, and the specimens suffer in consequence, frequently resulting in their death. All the mosses require a liberal supply of moisture at all seasons, to keep them in full health. A better proof of the truth of this assertion is not wanted than to point to the vigorous way in which they all grow naturally during the humid season of November and December. To keep them in first-rate condition, they should have a liberal sprinkling overhead three times a day through the summer, and at other times twice will be sufficient, unless the weather is particularly dry and warm. There need be little fear of their receiving too much. In the winter there will be sufficient atmospheric moisture, in addition to the rains, to keep them

damp enough, unless it should happen to be unexceptionally dry. In that case a sprinkle overhead will be of immense benefit to them. The planting should be conducted so that each species gets a position that bears a close affinity to the circumstances in which it is found in a natural state. Those that grow on stone or brickwork should be secured to those substances, whilst those growing in damp pools and ordinary soil should have like positions allotted to them. By taking notice of the conditions under which they are found, a good idea of the treatment they require may be formed by those who know little or nothing about the subject. The cultivator will find every bit of information picked up in this way of very great service to him, at some time or other.

The undermentioned species are all particularly beautiful, and have the great merit of thriving uncommonly well upon an artificially constructed rockery : — *Bartramia fontana*, *B. pomiformis*, *Bryum alpinum*, *B. capillare*, *B. argenteum*, *Dicranum squarrosum*, *Grimmia Doniana*, *G. leucophœa*, *G. pulvinata*, *Hookeria lucens*, *Hypnum denticulatum*, *H. cupressiforme*, *H. purum*, *H. Schreberi*, *H. splendens*, *Leskea sericea*, *Racomitrium canescens*, *Weissia contraversa*, the principal species of *Tortula*, and all the *Polytrichums*, and *Mniums*.

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